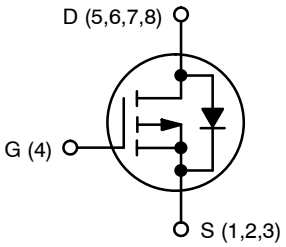
MOSFET – P-Channel, Logic Level, POWERTRENCH®

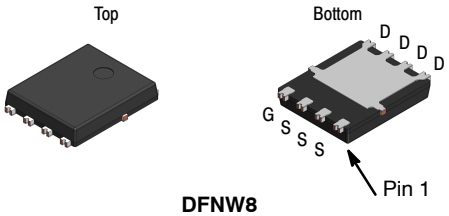
-40 V, -50 A, 13.5 mΩ

FDWS9510L-F085

V_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX
−40 V	13.5 mΩ @ −10 V	−50 A



P−Channel MOSFET



DFNW8
CASE 507AU

Features

- Typ $R_{DS(on)}$ = 11 mΩ at V_{GS} = −10 V; I_D = −50 A
- Typ $Q_{g(tot)}$ = 28 nC at V_{GS} = −10 V; I_D = −50 A
- UIS Capability
- Wettable Flanks for Automatic Optical Inspection (AOI)
- AEC−Q101 Qualified
- These Devices are Pb−Free and are RoHS Compliant

Applications

- Automotive Engine Control
- Powertrain Management
- Solenoid and Motor Drivers
- Electronic Steering
- Integrated Starter/Alternator
- Distributed Power Architectures and VRM
- Primary Switch for 12 V Systems

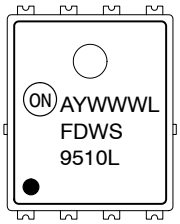
MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain−to−Source Voltage		V_{DSS}	−40	V
Gate−to−Source Voltage		V_{GS}	±16	V
Continuous Drain Current (V_{GS} = 10 V) (Note 1)	T_C = 25°C	I_D	−50	A
Pulsed Drain Current	T_C = 25°C		See Figure 4	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	32	mJ
Power Dissipation		P_D	75	W
Derate above 25°C			0.5	W/°C
Operating and Storage Temperature		T_J, T_{STG}	−55 to +175	°C
Thermal Resistance (Junction−to−Case)		$R_{\theta JC}$	2	°C/W
Maximum Thermal Resistance (Junction−to−Ambient) (Note 3)		$R_{\theta JA}$	50	°C/W

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Current is limited by wirebond configuration
2. Starting Tj = 25°C, L = 40 μH, I_{AS} = −40 A, V_{DD} = −40 V during inductor charging and V_{DD} = 0 V during time in avalanche
3. $R_{\theta JA}$ is the sum of the junction−to−case and case−to−ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design. The maximum rating presented here is based on mounting on a 1 in^2 pad of 2 oz copper.

MARKING DIAGRAM



A	= Assembly Location
Y	= Year
WW	= Work Week
WL	= Assembly Lot
FDWS	= Device Code
9510L	= Device Code

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
FDWS9510L−F085	DFNW8 (Power56) (Pb−Free)	3000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

© Semiconductor Components Industries, LLC, 2018

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
B_{VDSS}	Drain−to−Source Breakdown Voltage	I_D = −250 μA, V_{GS} = 0 V		−40	–	–	V
I_{DSS}	Drain−to−Source Leakage Current	V_{DS} = −40 V, V_{GS} = 0 V	T_J = 25°C	–	–	1	μA
			T_J = 175°C (Note 4)	–	–	1	mA
I_{GSS}	Gate−to−Source Leakage Current	V_{GS} = ±16 V		–	–	±100	nA
ON CHARACTERISTICS							
$V_{GS(th)}$	Gate−to−Source Threshold Voltage	V_{GS} = V_{DS}, I_D = −250 μA		−1	−1.8	−3	V
$R_{DS(on)}$	Drain−to−Source On−Resistance	I_D = −25 A, V_{GS} = −4.5 V		–	18	23	mΩ
		I_D = −50 A, V_{GS} = −10 V	T_J = 25°C	–	11	13.5	mΩ
			T_J = 175°C (Note 4)	–	18.8	23	
DYNAMIC CHARACTERISTICS							
C_{iss}	Input Capacitance	V_{DS} = −20 V, V_{GS} = 0 V, f = 1 MHz		–	2320	–	pF
C_{oss}	Output Capacitance			–	811	–	
C_{rss}	Reverse Transfer Capacitance			–	38	–	
R_g	Gate Resistance	V_{GS} = 0.5 V, f = 1 MHz		–	23	–	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{GS} = 0 to −10 V		–	28	37	nC
$Q_{g(th)}$	Threshold Gate Charge	V_{GS} = 0 to −1 V		–	4	–	
Q_{gs}	Gate−to−Source Gate Charge	V_{DD} = −20 V, I_D = −50 A		–	7	–	
Q_{gd}	Gate−to−Drain “Miller” Charge			–	4	–	
SWITCHING CHARACTERISTICS							
t_{on}	Turn−On Time	V_{DD} = −20 V, I_D = −50 A, V_{GS} = −10 V, R_{GEN} = 6 Ω		–	–	20	ns
$t_{d(on)}$	Turn−On Delay Time			–	10	–	
t_r	Turn−On Rise Time			–	4	–	
$t_{d(off)}$	Turn−Off Delay Time			–	110	–	
t_f	Turn−Off Fall Time			–	37	–	
t_{off}	Turn−Off Time			–	–	222	
DRAIN−SOURCE DIODE CHARACTERISTICS							
V_{SD}	Source−to−Drain Diode Voltage	I_{SD} = −50 A, V_{GS} = 0 V		–	−1	−1.25	V
		I_{SD} = −25 A, V_{GS} = 0 V		–	−0.9	−1.2	
T_{rr}	Reverse Recovery Time	I_F = −50 A, dI_{SD}/dt = 100 A/μs		–	44	62	ns
Q_{rr}	Reverse Recovery Charge			–	31	47	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. The maximum value is specified by design at T_J = 175°C. Product is not tested to this condition in production

TYPICAL CHARACTERISTICS

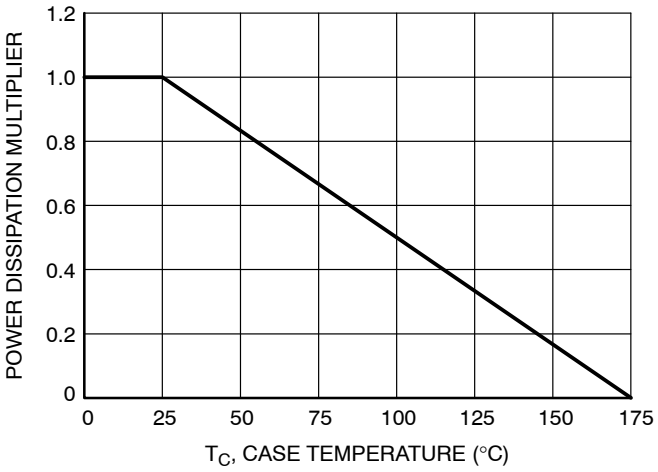


Figure 1. Normalized Power Dissipation vs. Case Temperature

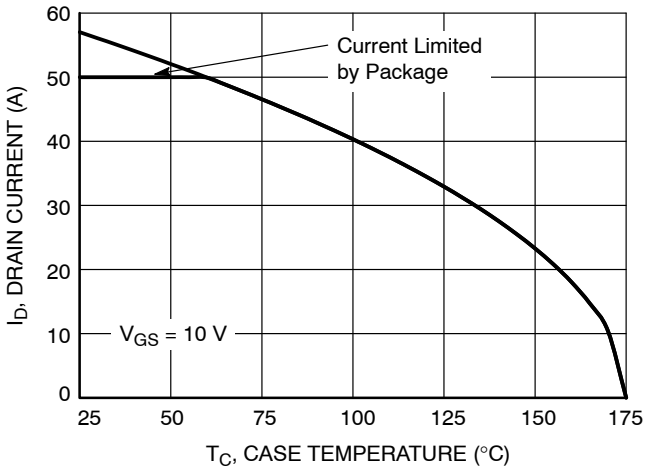


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

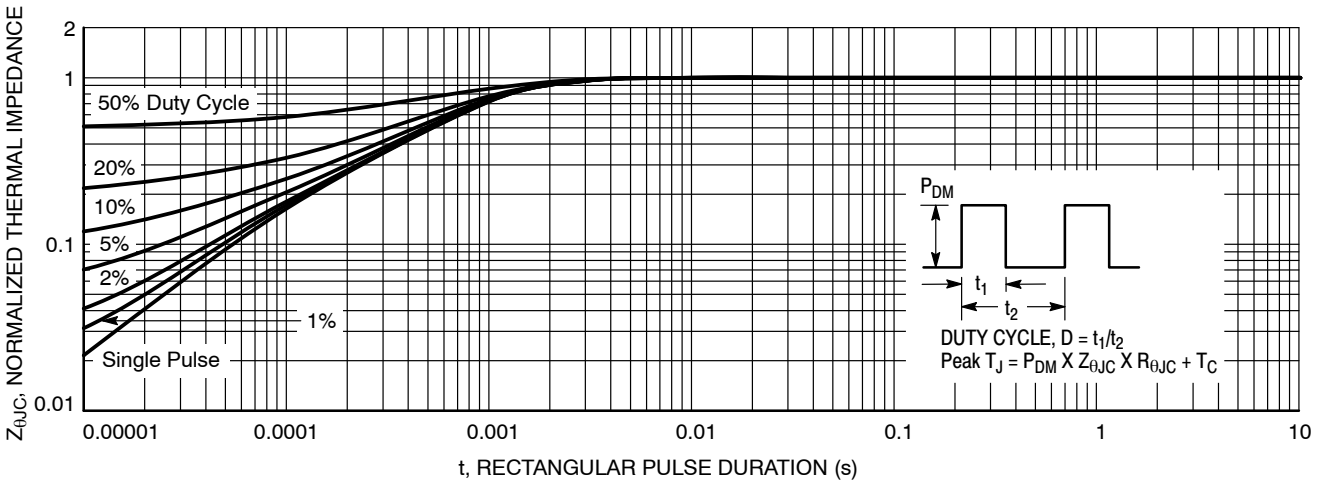


Figure 3. Normalized Maximum Transient Thermal Impedance

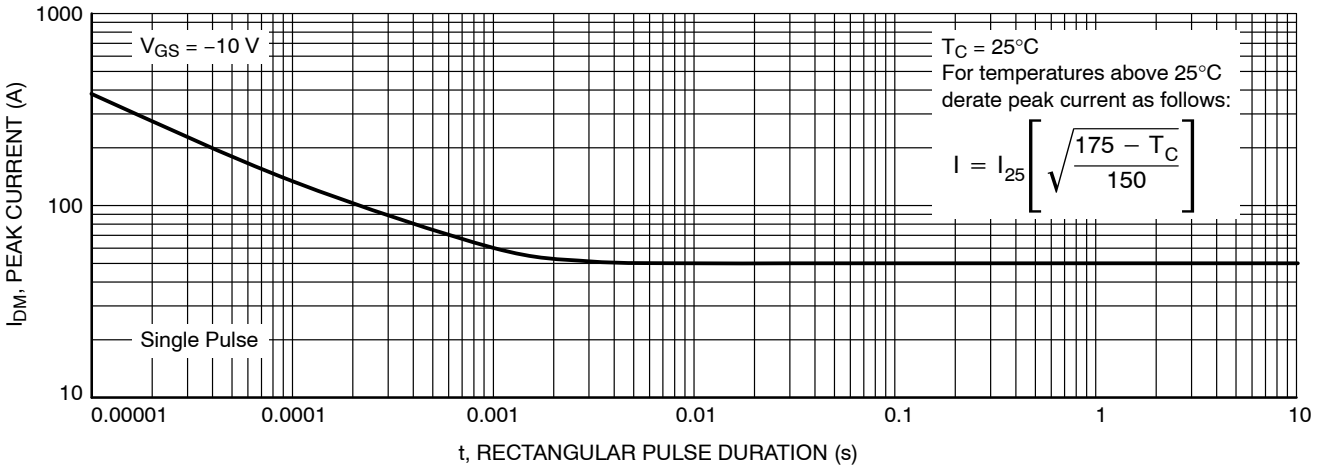


Figure 4. Peak Current Capability

TYPICAL CHARACTERISTICS

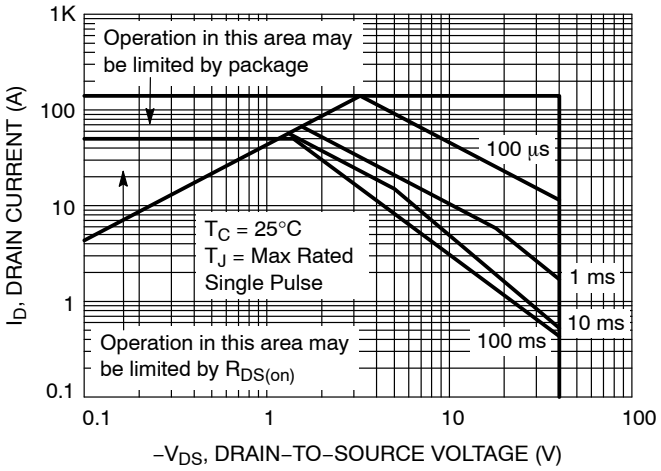


Figure 5. Forward Bias Safe Operating Area

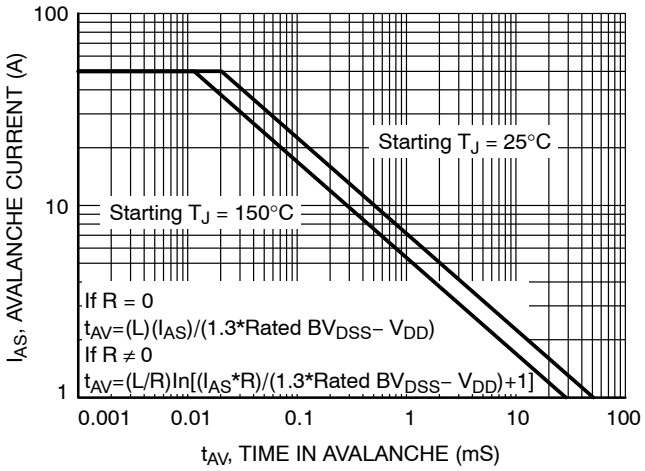


Figure 6. Unclamped Inductive Switching Capability

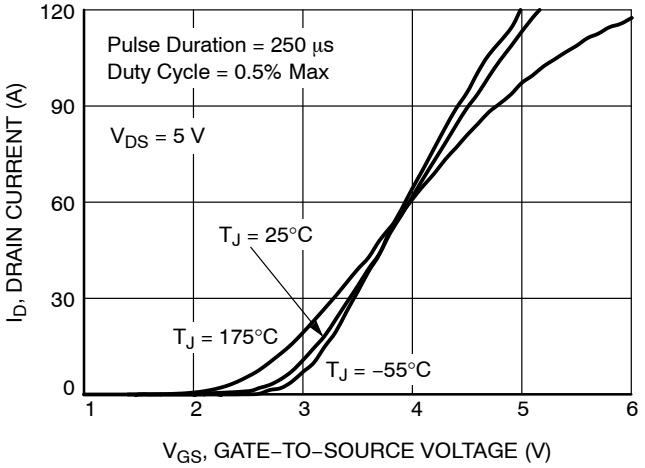


Figure 7. Transfer Characteristics

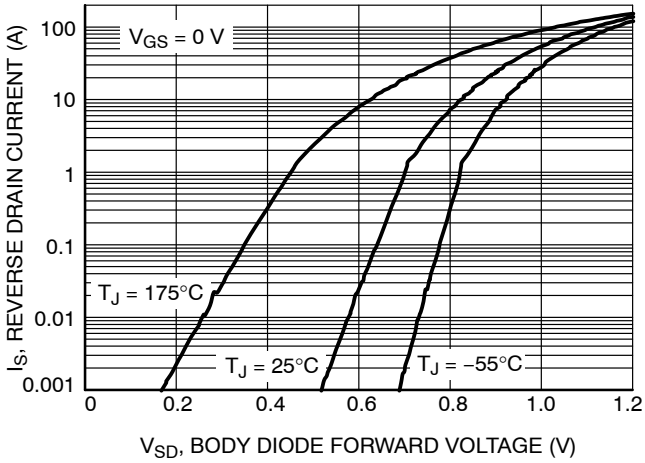


Figure 8. Forward Diode Characteristics

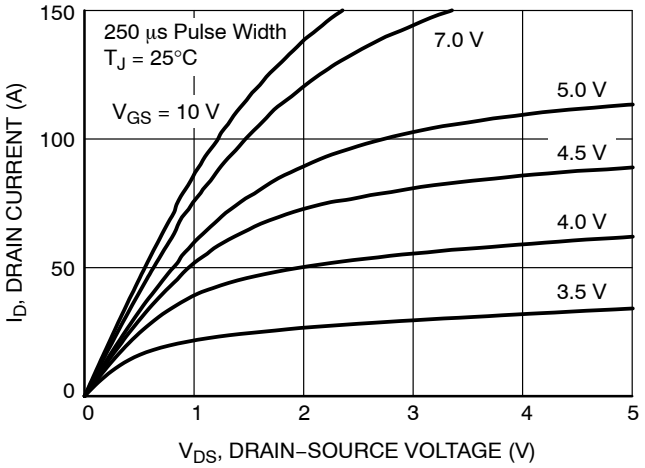


Figure 9. Saturation Characteristics

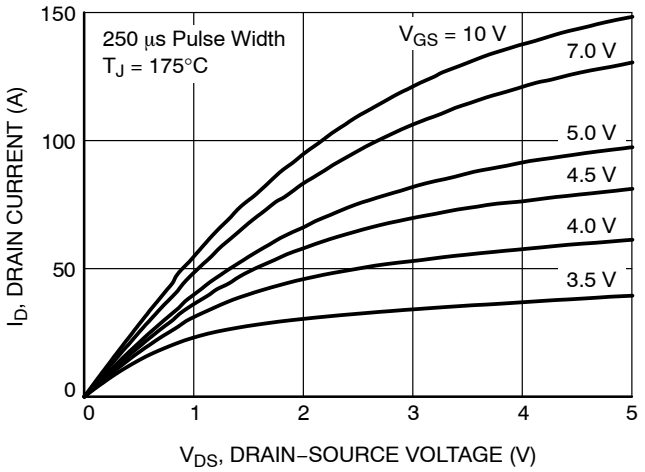


Figure 10. Saturation Characteristics

TYPICAL CHARACTERISTICS

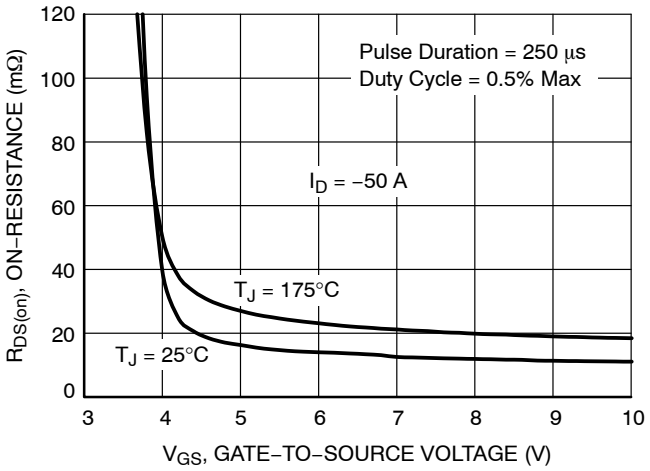


Figure 11. $R_{DS(on)}$ vs. Gate Voltage

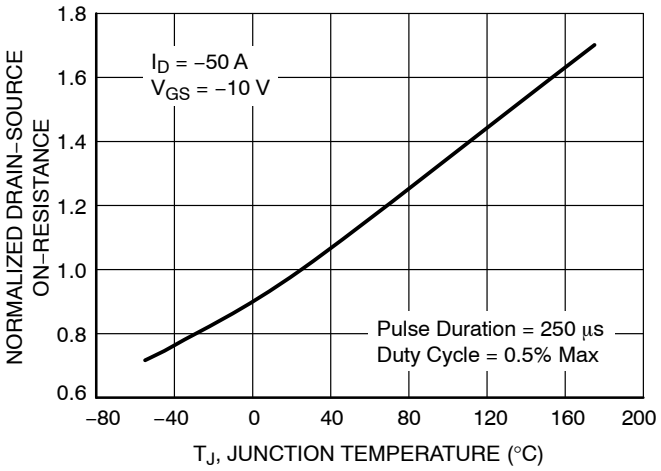


Figure 12. Normalized $R_{DS(on)}$ vs. Junction Temperature

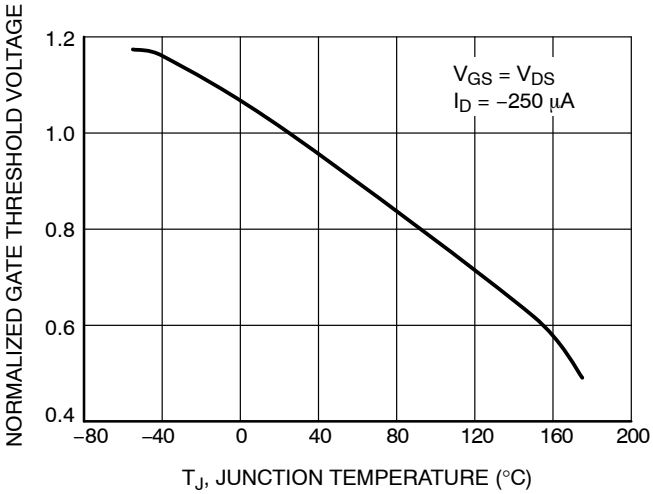


Figure 13. Normalized Gate Threshold Voltage vs. Temperature

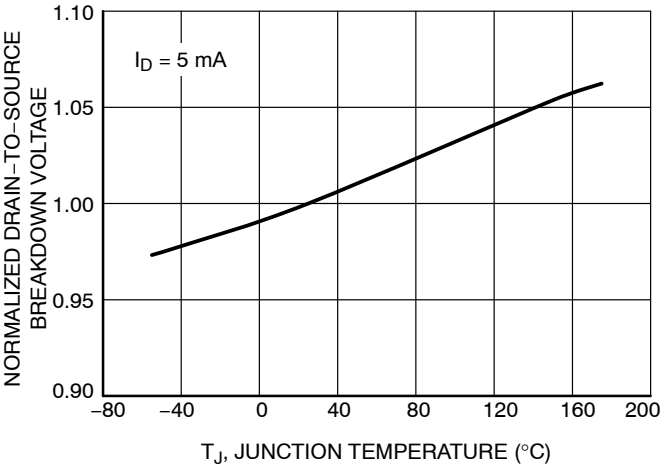


Figure 14. Normalized Drain−to−Source Breakdown Voltage vs. Junction Temperature

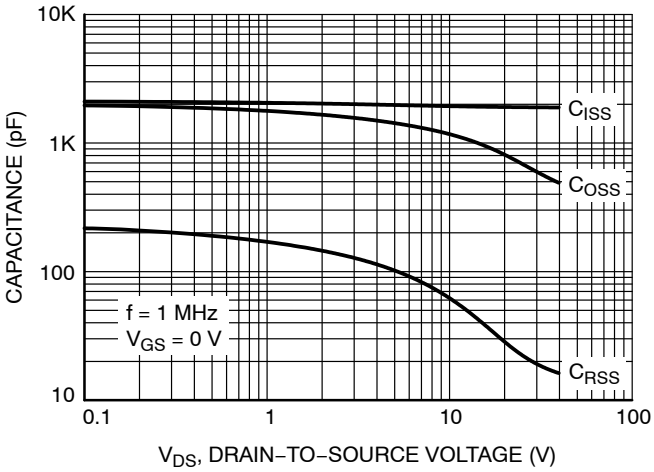


Figure 15. Capacitance vs. Drain−to−Source Voltage

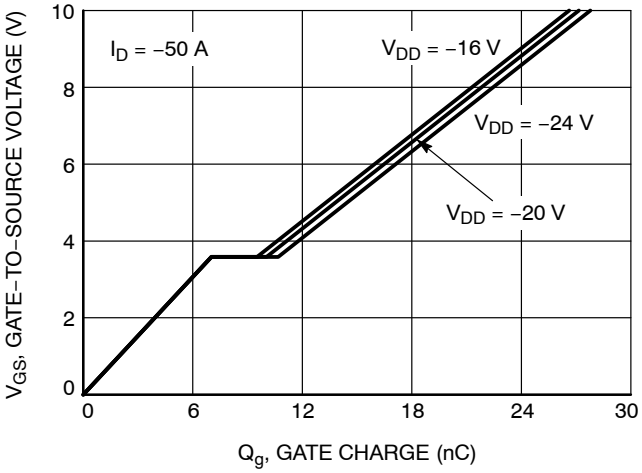
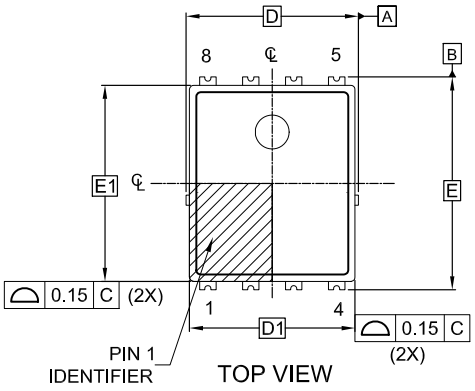
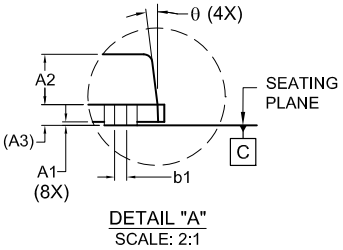


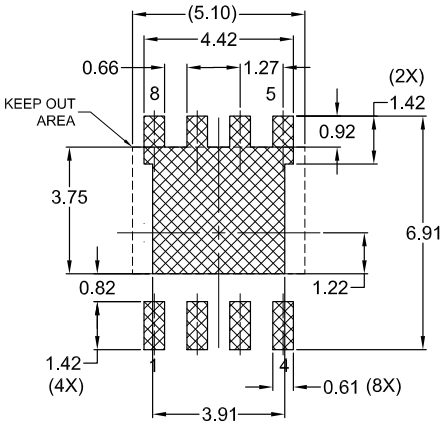
Figure 16. Gate Charge vs. Gate−to−Source Voltage

PACKAGE DIMENSIONS

DFNW8 5.2x6.3, 1.27P
CASE 507AU
ISSUE A

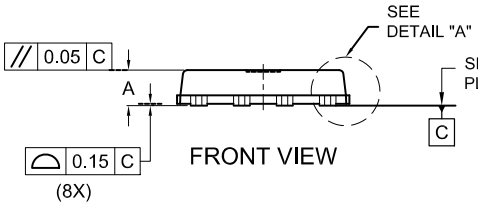






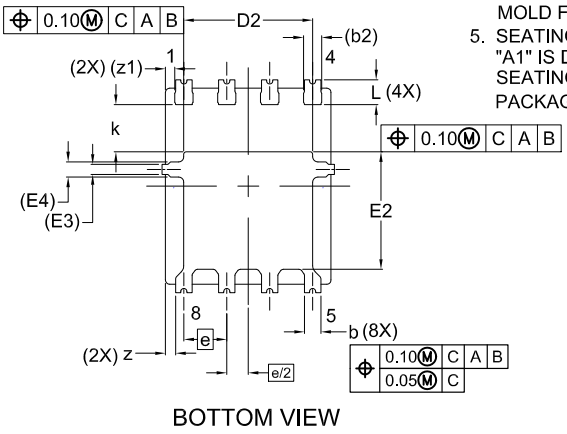
LAND PATTERN
RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	-	-	0.05
A2	0.65	0.75	0.85
A3		0.30 REF	
b	0.47	0.52	0.57
b1	0.13	0.18	0.23
b2		(0.54)	
D	5.00	5.10	5.20
D1	4.80	4.90	5.00
D2	3.72	3.82	3.92
E	6.20	6.30	6.40
E1	5.70	5.80	5.90
E2	3.38	3.48	3.58
E3		0.30 REF	
E4		0.45 REF	
e		1.27 BSC	
e/2		0.635BSC	
k	1.30	1.40	1.50
L	0.64	0.74	0.84
z	0.24	0.29	0.34
z1		(0.28)	
Θ	0°	---	12°

POWERTRENCH is a registered trademark of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries.

onsemi, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**’s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided “as−is” and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. “Typical” parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typicals” must be validated for each customer application by customer’s technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Email Requests to: orderlit@onsemi.com

onsemi Website: www.onsemi.com

TECHNICAL SUPPORT
North American Technical Support:
Voice Mail: 1 800−282−9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:
Phone: 00421 33 790 2910
For additional information, please contact your local Sales Representative

◊

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.