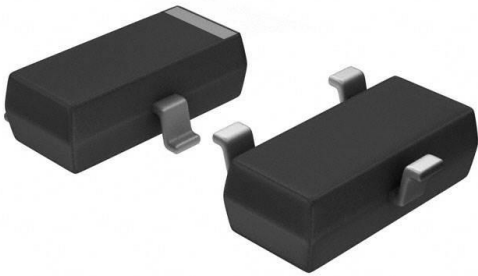


# FDN86265P Datasheet

[www.digi-electronics.com](http://www.digi-electronics.com)



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	FDN86265P-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	FDN86265P
Description	MOSFET P-CH 150V 800MA SUPERSOT3
Detailed Description	P-Channel 150 V 800mA (Ta) 1.5W (Ta) Surface Mount SOT-23-3



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

FDN86265P

Series:

PowerTrench®

FET Type:

P-Channel

Drain to Source Voltage (Vdss):

150 V

Drive Voltage (Max Rds On, Min Rds On):

6V, 10V

Vgs(th) (Max) @ Id:

4V @ 250µA

Vgs (Max):

±25V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

SOT-23-3

Base Product Number:

FDN86265

Manufacturer:

onsemi

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

800mA (Ta)

Rds On (Max) @ Id, Vgs:

1.2Ohm @ 800mA, 10V

Gate Charge (Qg) (Max) @ Vgs:

4.1 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

210 pF @ 75 V

Power Dissipation (Max):

1.5W (Ta)

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

# MOSFET – P-Channel, POWERTRENCH®

**-150 V, -0.8 A, 1.2 Ω**

## FDN86265P

### General Description

This P-Channel MOSFET is produced using **onsemi**'s advanced POWERTRENCH process that has been optimized for the on-state resistance and yet maintain superior switching performance.

### Features

- Max  $r_{DS(on)}$  = 1.2 Ω at  $V_{GS} = -10$  V,  $I_D = -0.8$  A  
Max  $r_{DS(on)}$  = 1.4 Ω at  $V_{GS} = -6$  V,  $I_D = -0.7$  A
- Very Low RDS-on Mid Voltage P-Channel Silicon Technology Optimised for Low Qg
- This Product is Optimised for Fast Switching Applications as Well as Load Switch Applications
- 100% UIL Tested
- Pb-Free, Halide Free and RoHS Compliant
- HBM ESD Level Class 0B, CDM ESD Level Class C3 (Note 4)

### Applications

- Active Clamp Switch
- Load Switch

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain to Source Voltage	-150	V
$V_{GS}$	Gate to Source Voltage	±25	V
$I_D$	Drain Current – Continuous (Note 1a) – Pulsed	-0.8 -5	A
$E_{AS}$	Single Pulse Avalanche Energy (Note 3)	6	mJ
$P_D$	Power Dissipation (Note 1a) (Note 1b)	1.5 0.6	W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	°C

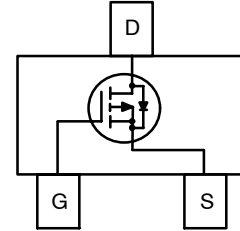
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

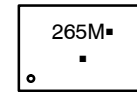
Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	75	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	80	°C/W



SOT-23/SUPERSOT™ -23, 3 LEAD,  
1.4x2.9  
CASE 527AG



### MARKING DIAGRAM



265 = Specific Device Code  
M = Month Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
FDN86265P	SOT-23 (Pb-Free/ Halide 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](http://www.onsemi.com/BRD8011/D).

## FDN86265P

ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted.)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = -250 \mu\text{A}$ , $V_{GS} = 0 \text{ V}$	-150	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = -250 \mu\text{A}$ , referenced to $25^\circ\text{C}$	-	-129	-	mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -120 \text{ V}$ , $V_{GS} = 0 \text{ V}$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage	$V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0 \text{ V}$	-	-	$\pm 100$	nA

## ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = -250 \mu\text{A}$	-2	-3.3	-4	V
$\Delta V_{GS(th)} / \Delta T_J$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = -250 \mu\text{A}$ , referenced to $25^\circ\text{C}$	-	5	-	mV/ $^\circ\text{C}$
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = -10 \text{ V}$ , $I_D = -0.8 \text{ A}$ $V_{GS} = -6 \text{ V}$ , $I_D = -0.7 \text{ A}$ $V_{GS} = -10 \text{ V}$ , $I_D = -0.8 \text{ A}$ , $T_J = 125^\circ\text{C}$	-	0.85 0.96 1.54	1.2 1.4 2.2	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = -10 \text{ V}$ , $I_D = -0.8 \text{ A}$	-	1.5	-	S

## DYNAMIC CHARACTERISTICS

$C_{iss}$	Input Capacitance	$V_{DS} = -75 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1 \text{ MHz}$	-	158	210	pF
$C_{oss}$	Output Capacitance		-	17	25	pF
$C_{rss}$	Reverse Transfer Capacitance		-	1.6	5	pF
$R_g$	Gate Resistance		0.1	3.3	6.7	$\Omega$

## SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -75 \text{ V}$ , $I_D = -0.8 \text{ A}$ , $V_{GS} = -10 \text{ V}$ , $R_{GEN} = 6 \Omega$	-	5.7	12	ns
$t_r$	Rise Time		-	2.2	10	ns
$t_{d(off)}$	Turn-Off Delay Time		-	7.9	16	ns
$t_f$	Fall Time		-	9.9	20	ns
$Q_g$	Total Gate Charge		$V_{GS} = 0 \text{ V}$ to $-10 \text{ V}$ , $V_{DD} = -75 \text{ V}$ , $I_D = -0.8 \text{ A}$ ,	-	2.9	4.1
$Q_{gs}$	Gate to Source Gate Charge	$V_{DD} = -75 \text{ V}$ , $I_D = -0.8 \text{ A}$	-	0.8	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge		-	0.8	-	nC

## DRAIN-SOURCE DIODE CHARACTERISTICS

$V_{SD}$	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}$ , $I_S = -0.8 \text{ A}$ (Note 2)	-	-0.86	-1.3	V
$t_{rr}$	Reverse Recovery Time	$I_F = -0.8 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$	-	49	78	ns
$Q_{rr}$	Reverse Recovery Charge		-	70	112	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.

## NOTES:

- $R_{\theta JA}$  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  $R_{\theta CA}$  is determined by the user's board design.



a)  $80^\circ\text{C}/\text{W}$  when mounted on a 1 in<sup>2</sup> pad of 2 oz. copper.



b)  $180^\circ\text{C}/\text{W}$  when mounted on a minimum pad.

- Pulse Test: Pulse Width < 300  $\mu\text{s}$ , Duty Cycle < 2.0%.
- Starting  $T_J = 25^\circ\text{C}$ ; N-ch:  $L = 3 \text{ mH}$ ,  $I_{AS} = -2 \text{ A}$ ,  $V_{DD} = -150 \text{ V}$ ,  $V_{GS} = -10 \text{ V}$ . 100% test at  $L = 0.1 \text{ mH}$ ,  $I_{AS} = -9 \text{ A}$ .
- ESD between the gate and source serves only, no gate overvoltage rating is implied.

# FDN86265P

## TYPICAL CHARACTERISTICS

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

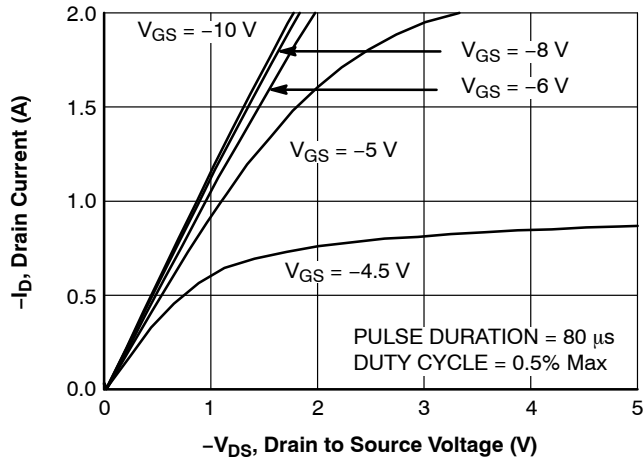


Figure 1. On Region Characteristics

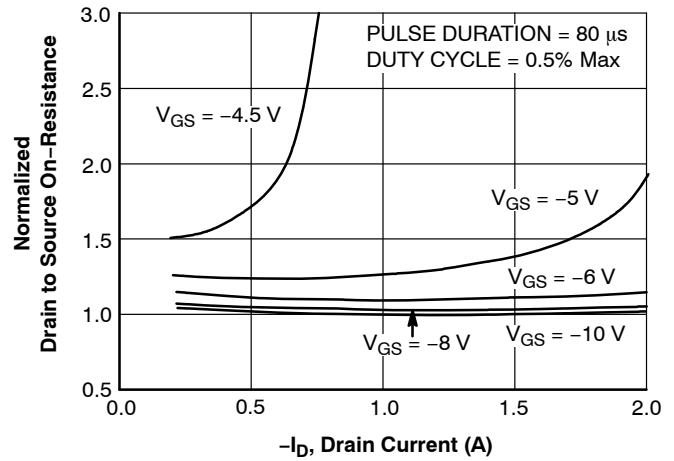


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

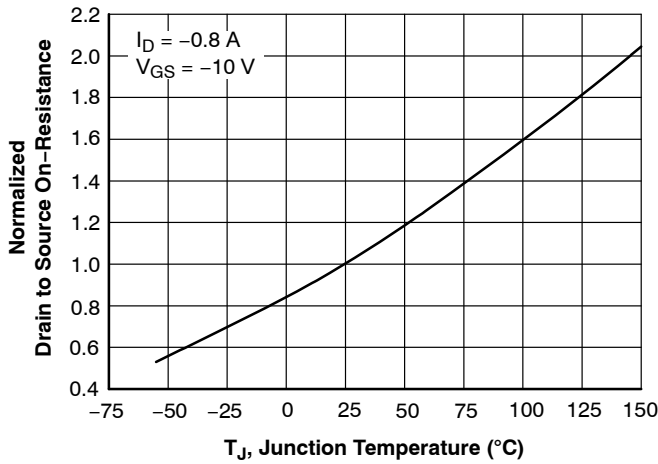


Figure 3. Normalized On Resistance vs. Junction Temperature

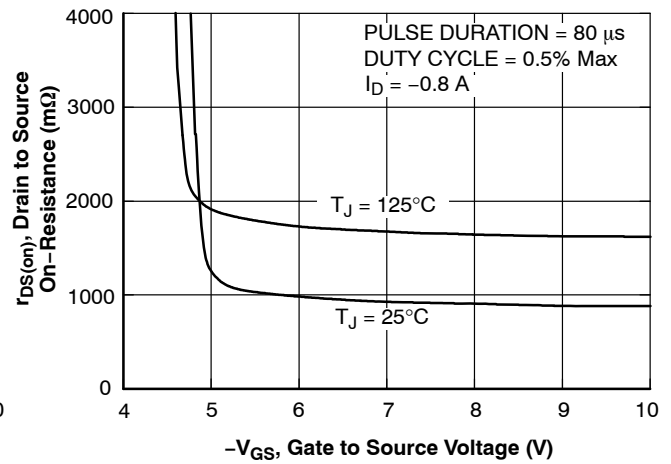


Figure 4. On-Resistance vs. Gate to Source Voltage

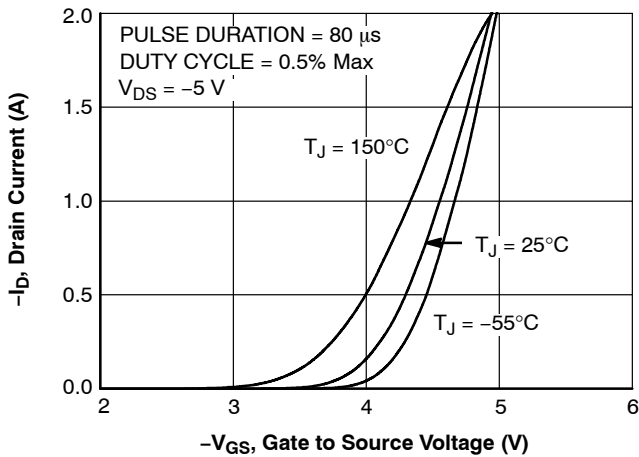


Figure 5. Transfer Characteristics

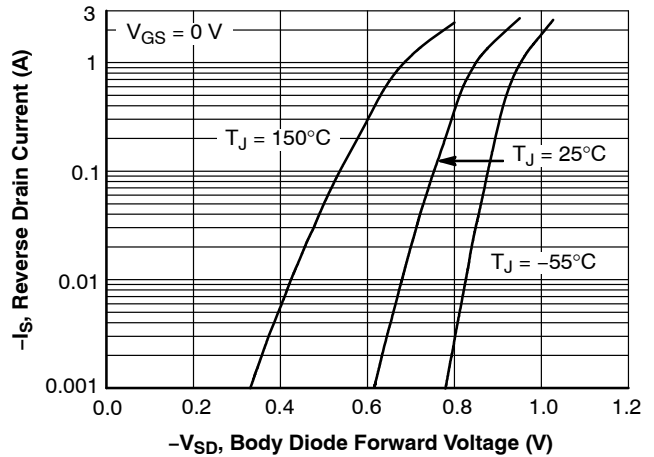


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

# FDN86265P

## TYPICAL CHARACTERISTICS (CONTINUED)

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

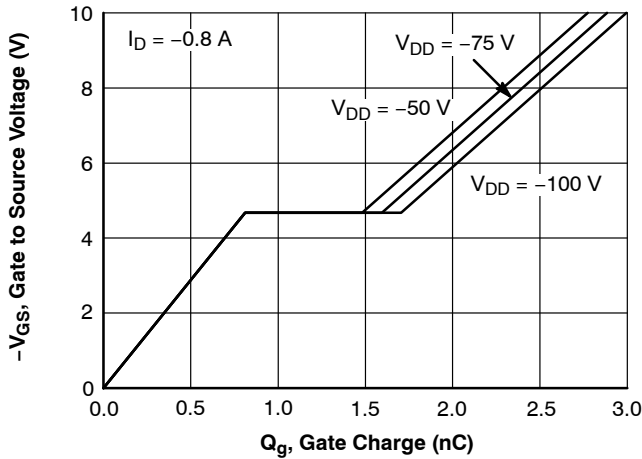


Figure 7. Gate Charge Characteristics

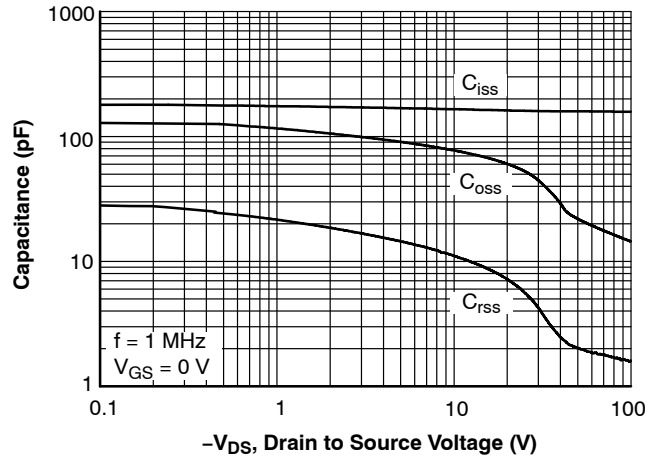


Figure 8. Capacitance vs. Drain to Source Voltage

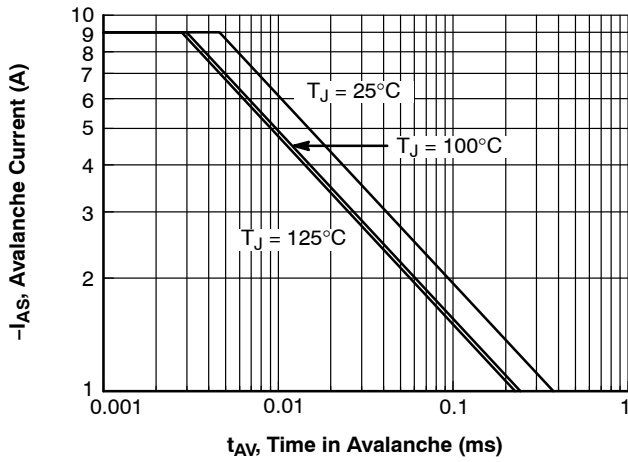


Figure 9. Unclamped Inductive Switching Capability

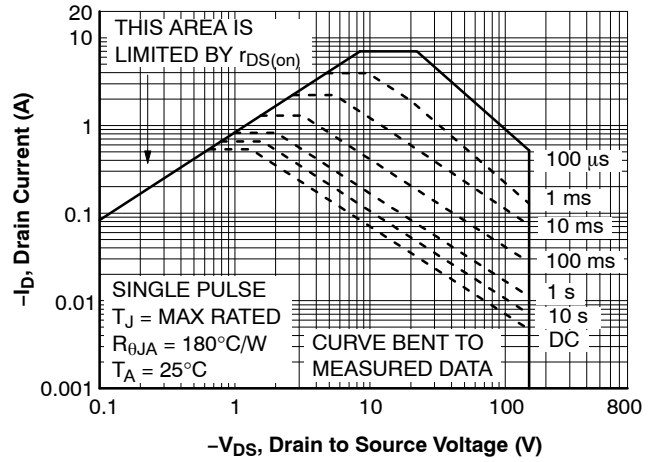


Figure 10. Forward Bias Safe Operating Area

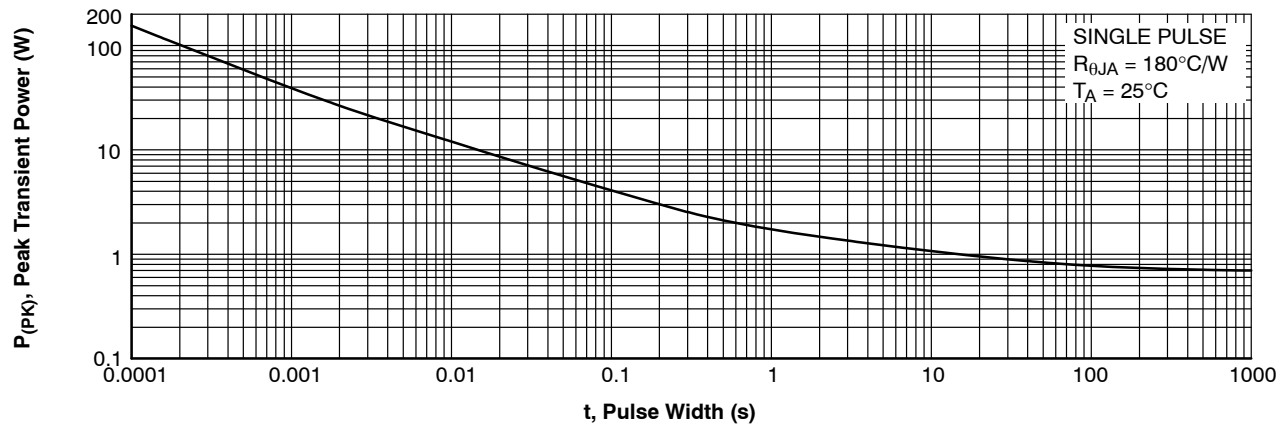


Figure 11. Single Pulse Maximum Power Dissipation

### FDN86265P

#### TYPICAL CHARACTERISTICS (CONTINUED)

( $T_J = 25^\circ\text{C}$  unless otherwise noted)

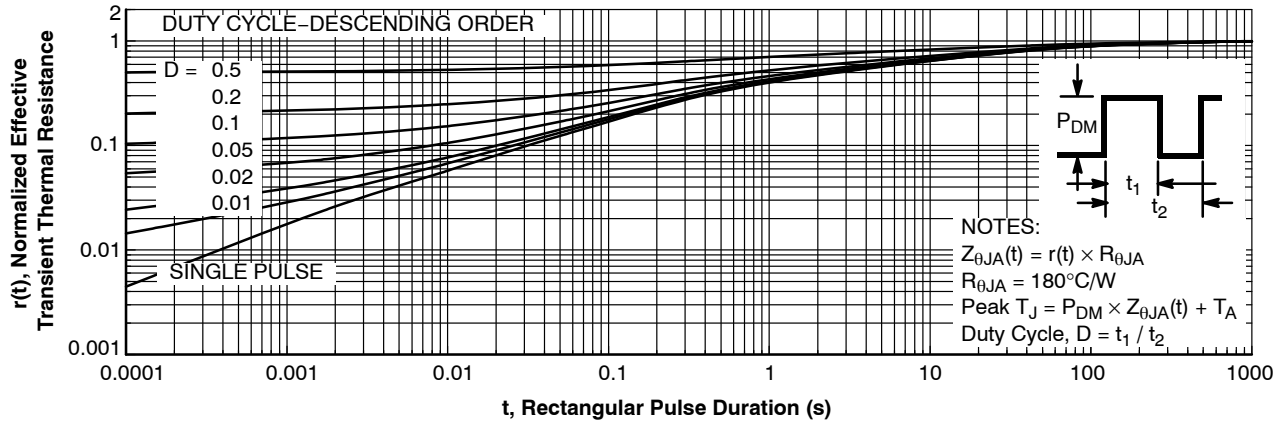


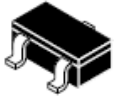
Figure 12. Junction-to-Ambient Transient Thermal Response Curve

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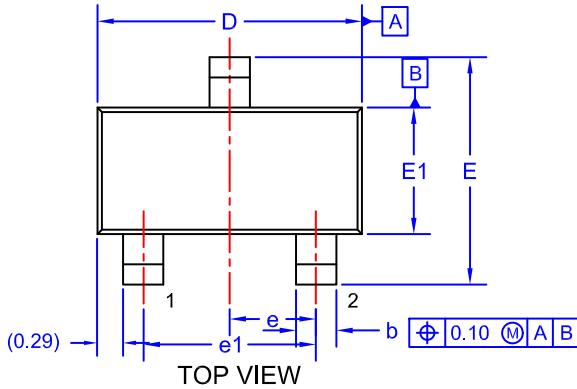


**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



**SOT-23/SUPERSOT™ -23, 3 LEAD, 1.4x2.9**  
CASE 527AG  
ISSUE A

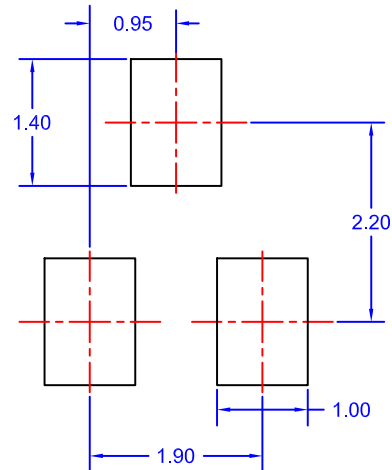
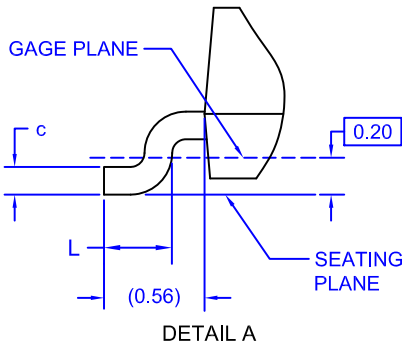
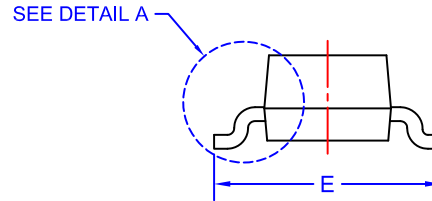
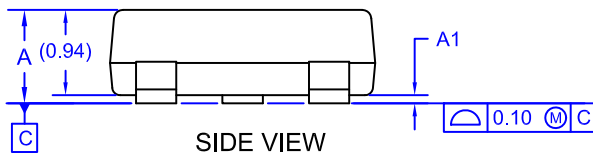
DATE 09 DEC 2019



NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

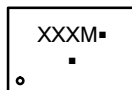
DIM	MIN.	NOM.	MAX.
A	0.85	0.95	1.12
A1	0.00	0.05	0.10
b	0.370	0.435	0.508
c	0.085	0.150	0.180
D	2.80	2.92	3.04
E	2.31	2.51	2.71
E1	1.20	1.40	1.52
e	0.95 BSC		
e1	1.90 BSC		
L	0.33	0.38	0.43



**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.

**GENERIC MARKING DIAGRAM\***



- XXX = Specific Device Code
- M = Month Code
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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<b>DESCRIPTION:</b>	<b>SOT-23/SUPERSOT-23, 3 LEAD, 1.4X2.9</b>	<b>PAGE 1 OF 1</b>

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