

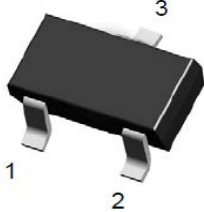
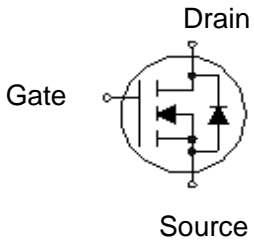
### N-Channel High Density Trench MOSFET (20V, 5.4A)

#### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(on)}$ (m $\Omega$ ) Tpy.
20V	5.4A	23 @ $V_{GS} = 4.0V, I_D=5.4A$
		30 @ $V_{GS} = 2.5V, I_D=4.3A$

#### Features

- Super high dense cell trench design for low  $R_{DS(on)}$
- Advanced Trench Process Technology
- SOT-23 package
- Lead (Pb) -free and halogen-free

	<p>EN2300 Pin Assignment &amp; Symbol 3-Lead Plastic SOT-23 Pin 1: Gate Pin 2: Source Pin 3: Drain</p>	
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#### Absolute Maximum Ratings ( $T_A=25^\circ C$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current (Continuous)	5.4	A
$I_{DM}$	Drain Current (Pulsed) <sup>a</sup>	24	A
$P_D$	Total Power Dissipation @ $T_A=25^\circ C$	1.25	W
$I_S$	Maximum Diode Forward Current	1.7	A
$T_J, T_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$
$R_{QJA}$	Thermal Resistance Junction to Ambient (PCB mounted) <sup>b</sup>	140	$^\circ C/W$

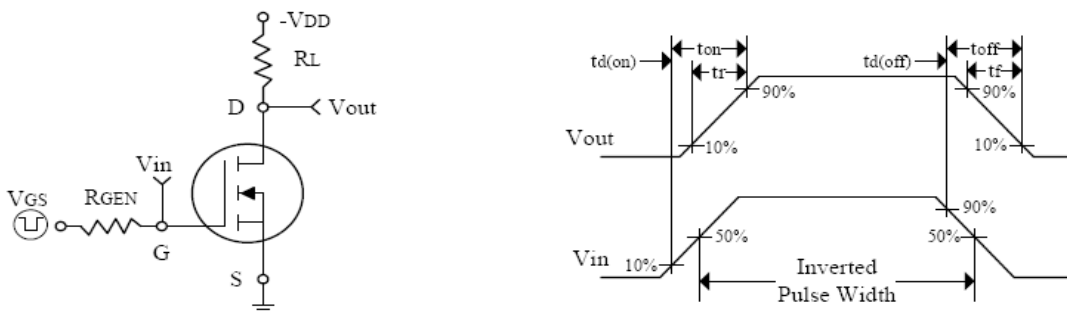
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in<sup>2</sup> 2oz Cu PCB board

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
<b>• Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>• On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.65	1.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=4.5V, I_D=2.8A$	-	23	30	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$	-	30	40	
<b>• Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=6V, V_{GS}=0V, f=1\text{MHz}$	-	522	-	PF
$C_{oss}$	Output Capacitance		-	136	-	
$C_{rss}$	Reverse Transfer Capacitance		-	112	-	
<b>• Switching Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=6V, I_D=5.4A, V_{GS}=4.5V$	-	5	-	nC
$Q_{gs}$	Gate-Source Charge		-	0.9	-	
$Q_{gd}$	Gate-Drain Charge		-	1.4	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=-6V, R_L=6\Omega, I_D=1A, V_{GEN}=4.5V, R_G=6\Omega$	-	10.9	-	nS
$t_r$	Turn-on Rise Time		-	4.1	-	
$t_{d(off)}$	Turn-off Delay Time		-	22.2	-	
$t_f$	Turn-off Fall Time		-	5.8	-	
<b>• Drain-Source Diode Characteristics</b>						
$V_{SD}$	Drain-Source Diode Forward	$V_{GS}=0V, I_S=1.7A$	-	-	1.2	V

Note: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$



Switching Test Circuit and Switching Waveforms

### Typical Characteristics Curves (Ta=25°C, unless otherwise note)

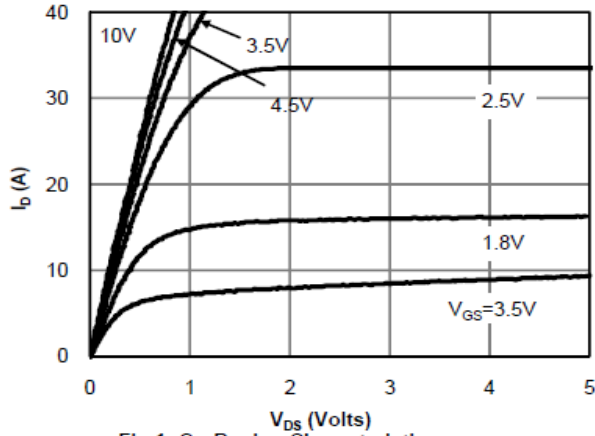


Fig 1: On-Region Characteristics

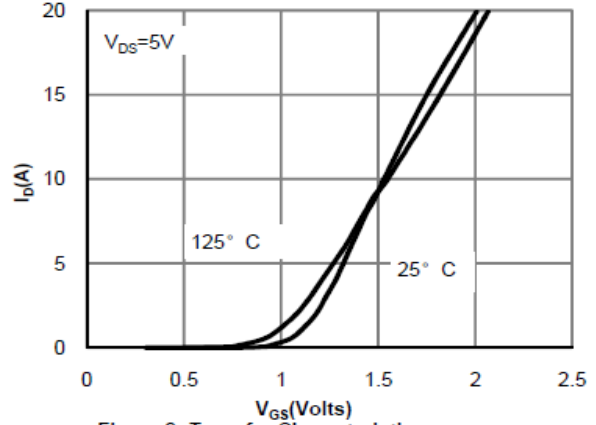


Figure 2: Transfer Characteristics

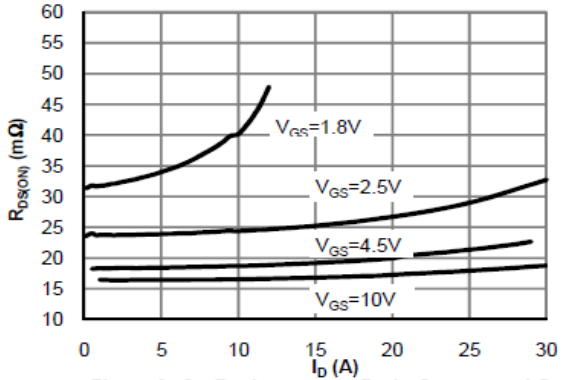


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

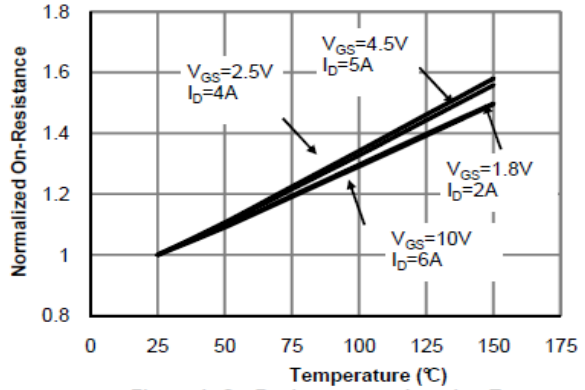


Figure 4: On-Resistance vs. Junction Temperature

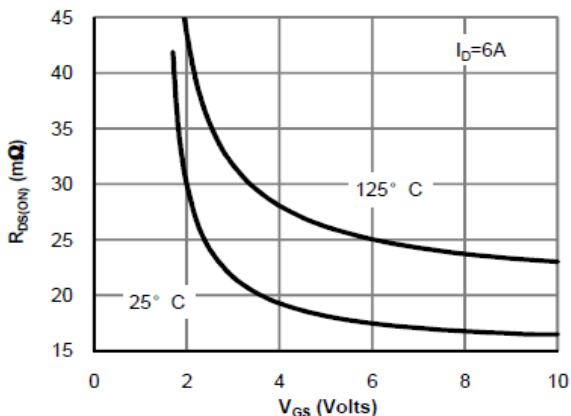


Figure 5: On-Resistance vs. Gate-Source Voltage

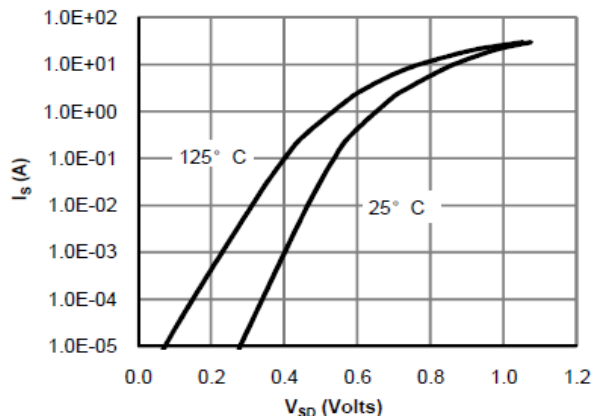


Figure 6: Body-Diode Characteristics (Note E)

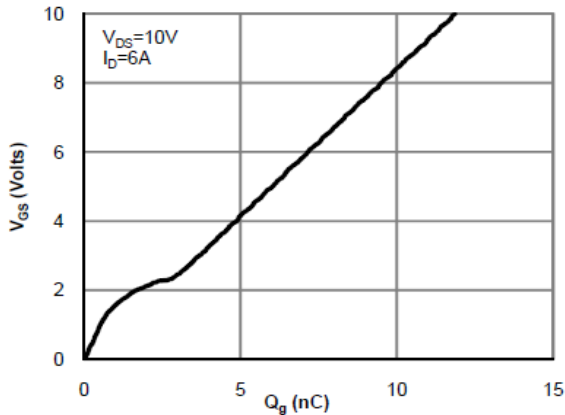


Figure 7: Gate-Charge Characteristics

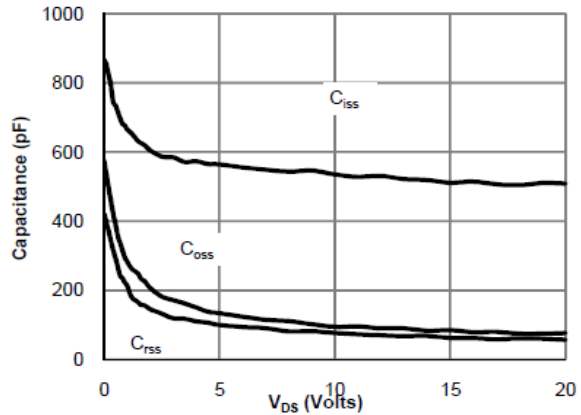


Figure 8: Capacitance Characteristics

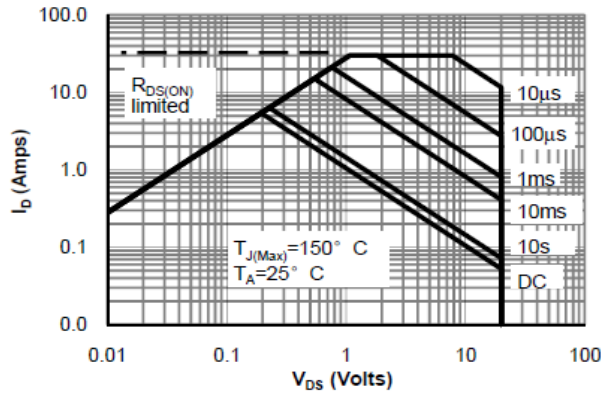


Figure 9: Maximum Forward Biased Safe Operating Area

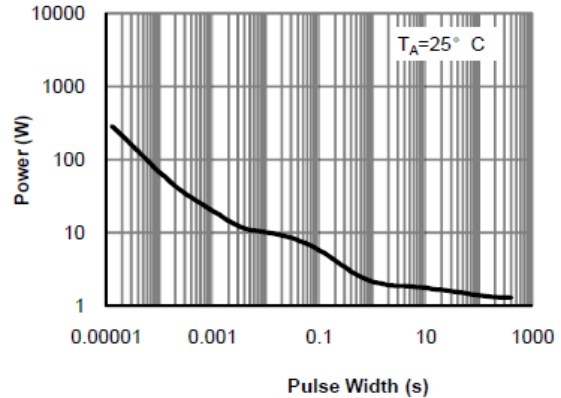


Figure 10: Single Pulse Power Rating Junction-to-Ambient

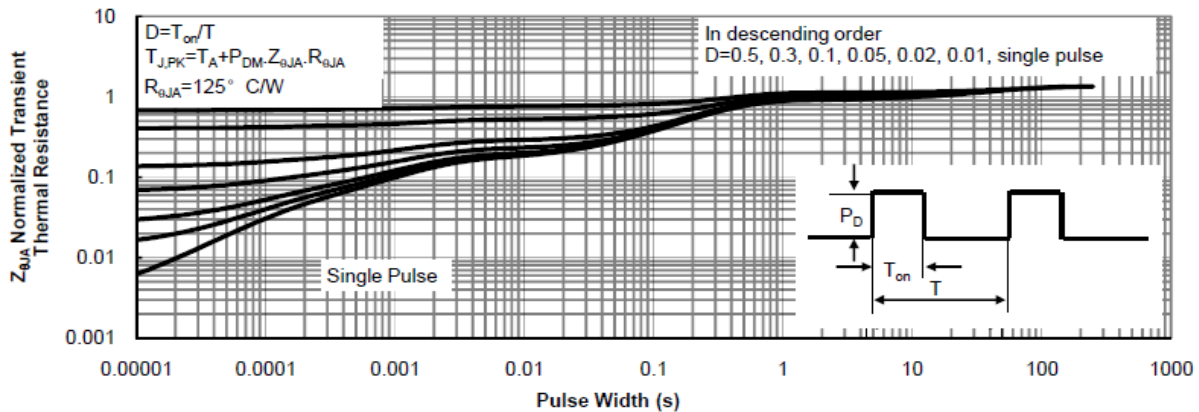
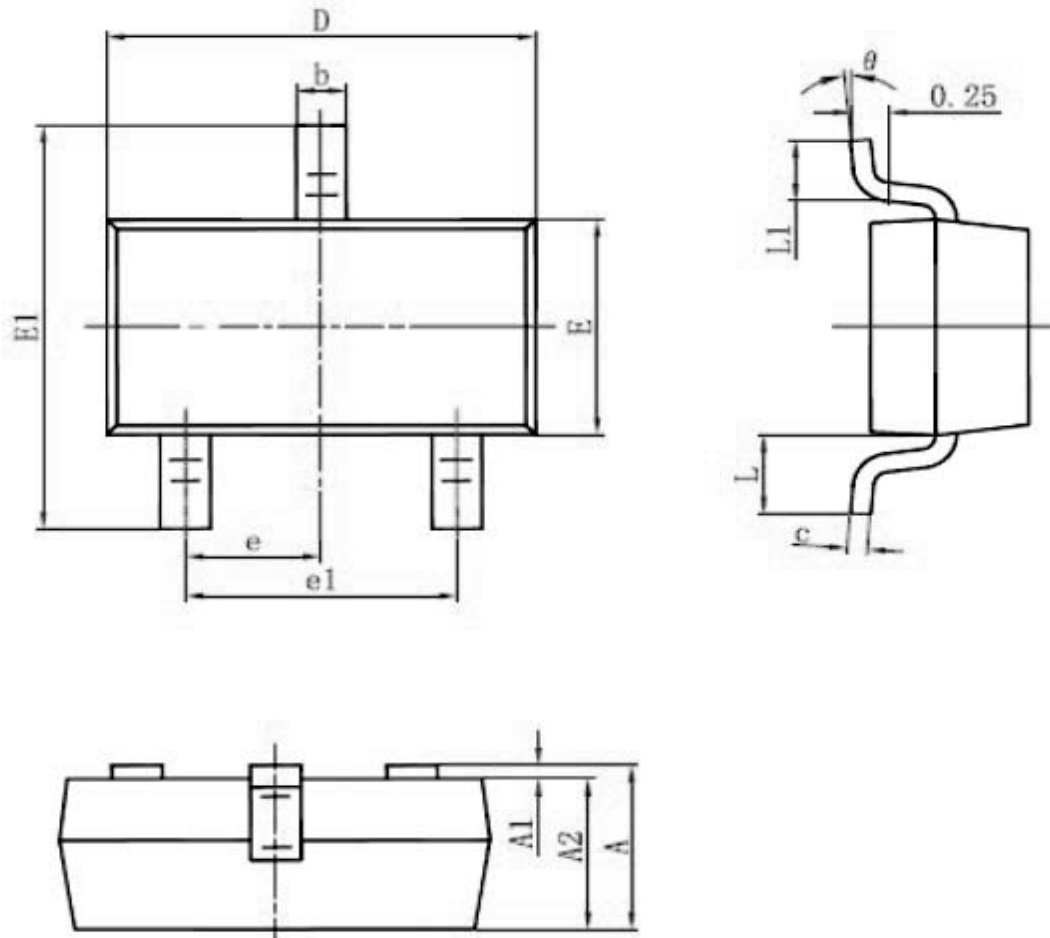


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

### SOT-23L PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

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