

N-Channel 150-V (D-S) MOSFET

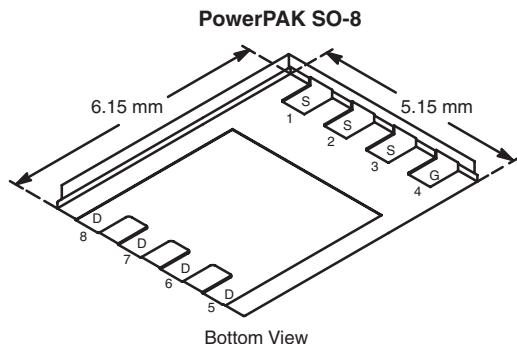
PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)^a	Q_g (Typ.)
150	0.038 at $V_{GS} = 10$ V	30	35 nC

FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- 100 % UIS Tested



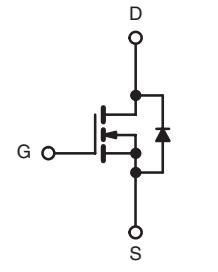
RoHS
COMPLIANT
HALOGEN
FREE
Available



Ordering Information: Si7738DP-T1-E3 (Lead (Pb)-free)
Si7738DP-T1-GE3 (Lead (Pb)-free and Halogen-free)

APPLICATIONS

- Primary Side Switch



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	150		V
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current ($T_J = 150$ °C)	I_D	30 ^a		A
		26		
		7.7 ^{b, c}		
		6.2 ^{b, c}		
Pulsed Drain Current	I_{DM}	30		
Continuous Source-Drain Diode Current	I_S	30 ^a		
		4.5 ^{b, c}		
Single Pulse Avalanche Current	I_{AS}	30		
Single Pulse Avalanche Energy	E_{AS}	45	mJ	
Maximum Power Dissipation	P_D	96		W
		62		
		5.4 ^{b, c}		
		3.5 ^{b, c}		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260		

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	18	23	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1	

Notes:

- a. Package limited
- b. Surface Mounted on 1" x 1" FR4 board.
- c. t = 10 s.
- d. See Solder Profile (www.vishay.com/ppg?73257). The PowerPAK SO-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- e. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.
- f. Maximum under Steady State conditions is 65 °C/W.

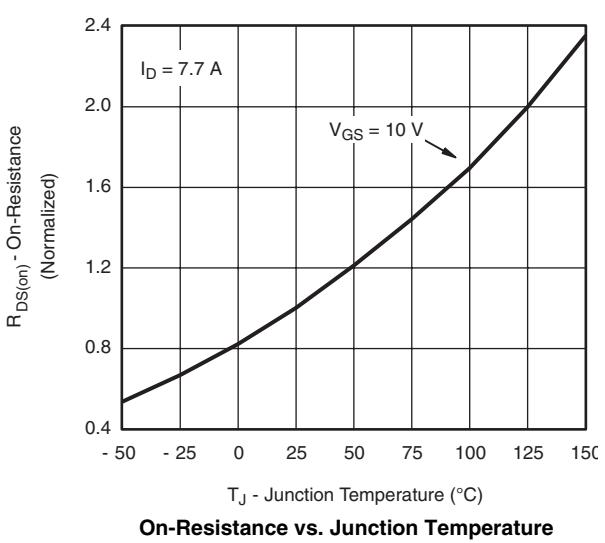
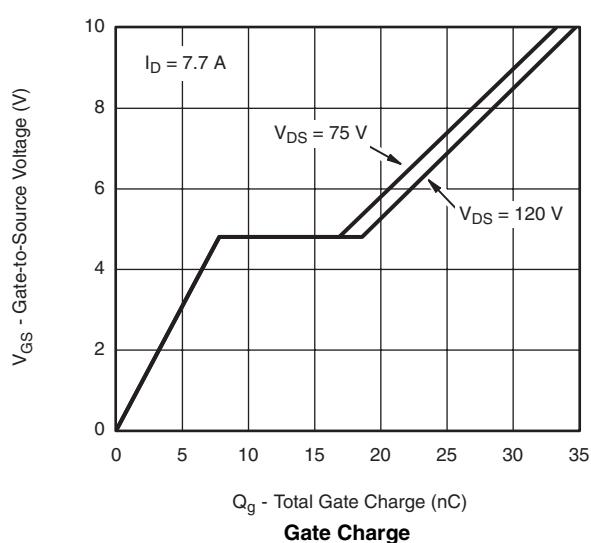
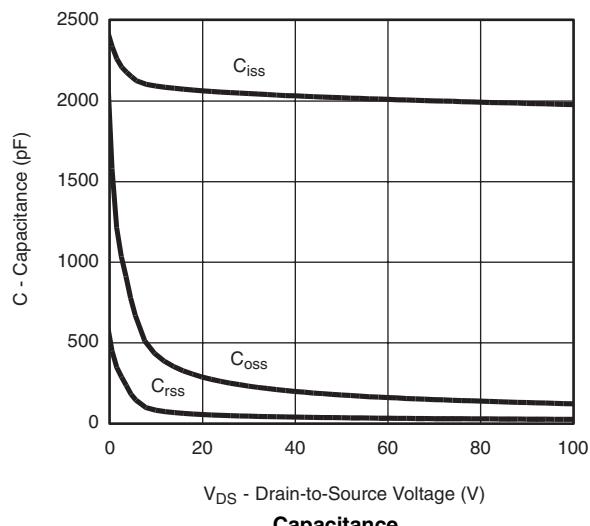
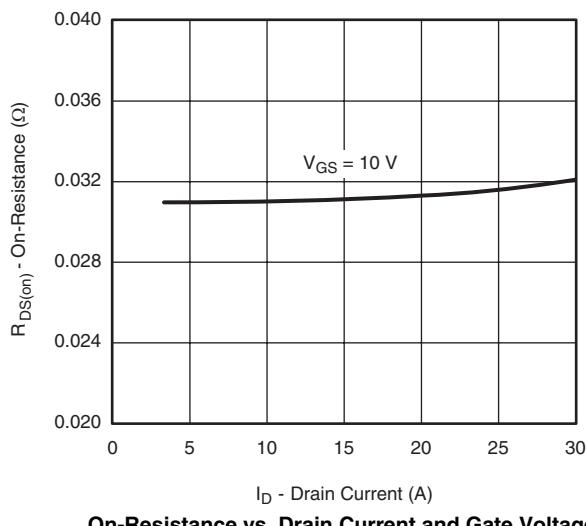
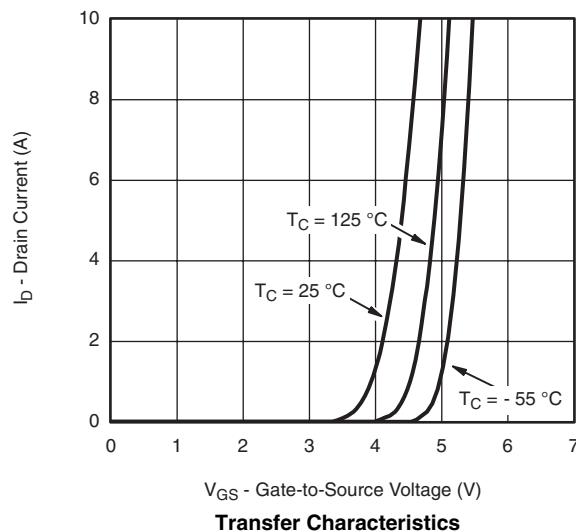
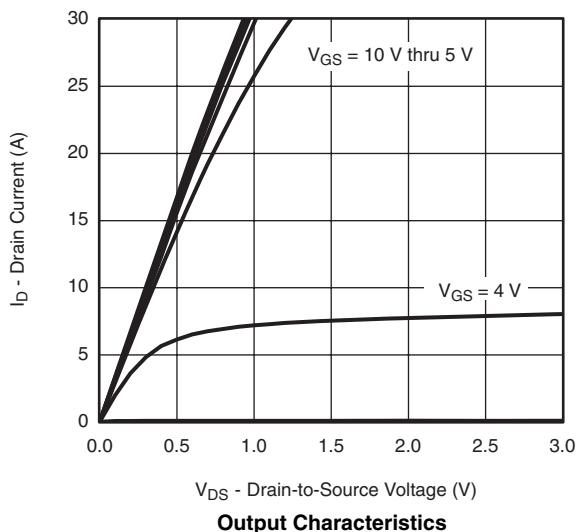
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	150			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		200		$\text{mV/}^\circ\text{C}$
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			- 10		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	2		4	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 150 \text{ V}$, $V_{GS} = 0 \text{ V}$			1	μA
		$V_{DS} = 150 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	30			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 7.7 \text{ A}$		0.031	0.038	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 7.7 \text{ A}$		22		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 75 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		2100		pF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			45		
Total Gate Charge	Q_g	$V_{DS} = 75 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 7.7 \text{ A}$		35	53	nC
Gate-Source Charge	Q_{gs}			8		
Gate-Drain Charge	Q_{gd}			9		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		1.6		Ω
Turn-on Delay Time	$t_{d(\text{on})}$	$V_{DD} = 75 \text{ V}$, $R_L = 12 \Omega$ $I_D \geq 6.2 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$		15	25	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(\text{off})}$			25	40	
Fall Time	t_f			10	15	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			30	A
Pulse Diode Forward Current	I_{SM}				30	
Body Diode Voltage	V_{SD}	$I_S = 6.2 \text{ A}$, $V_{GS} = 0 \text{ V}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 6.2 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		75	115	ns
Body Diode Reverse Recovery Charge	Q_{rr}			245	370	
Reverse Recovery Fall Time	t_a			58		ns
Reverse Recovery Rise Time	t_b			17		

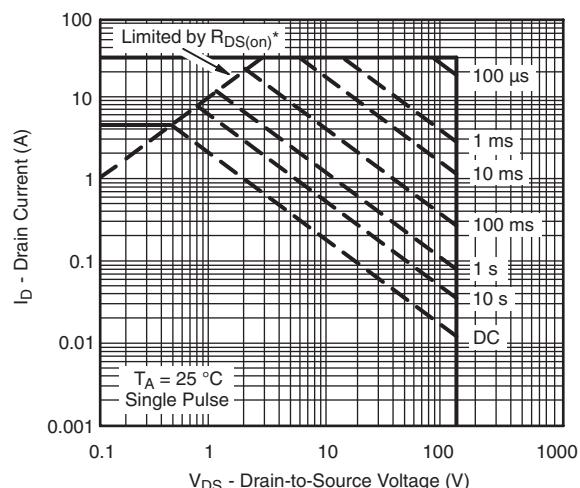
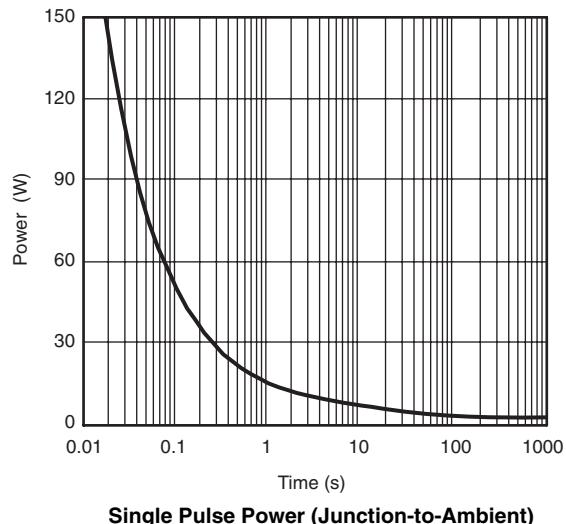
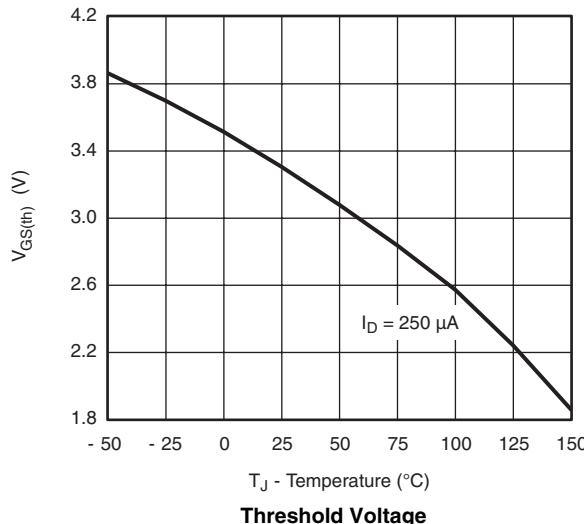
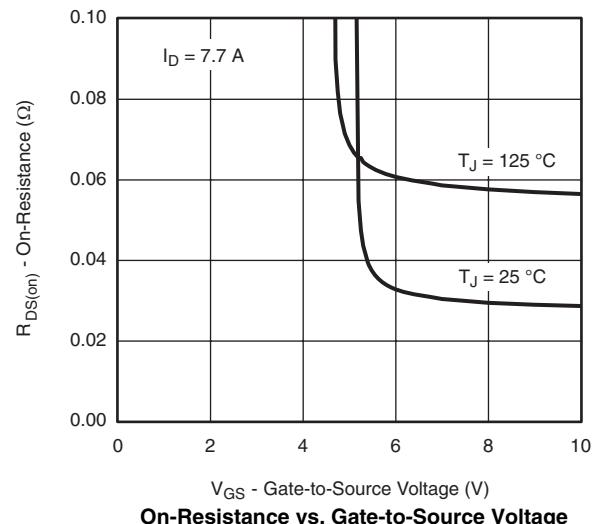
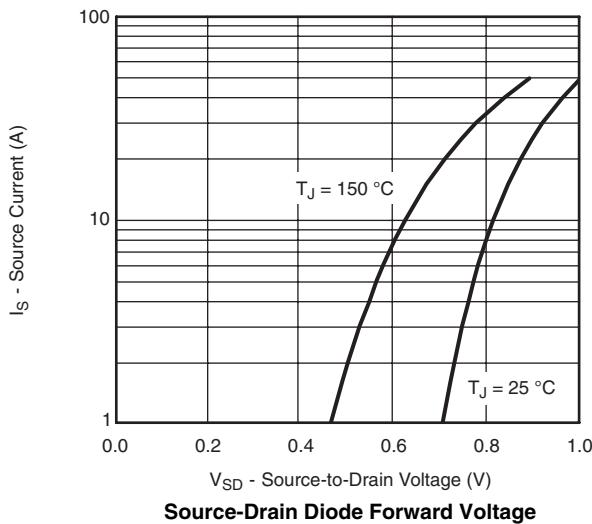
Notes:

- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$
- b. Guaranteed by design, not subject to production testing.

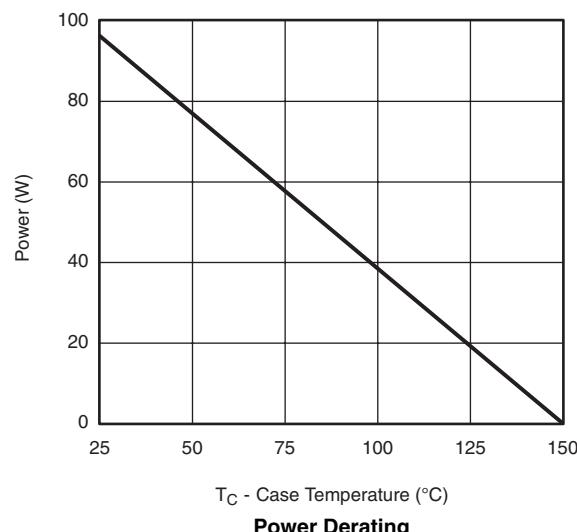
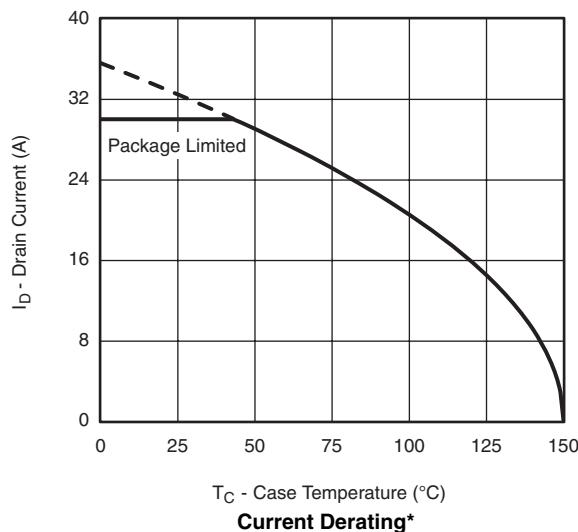
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


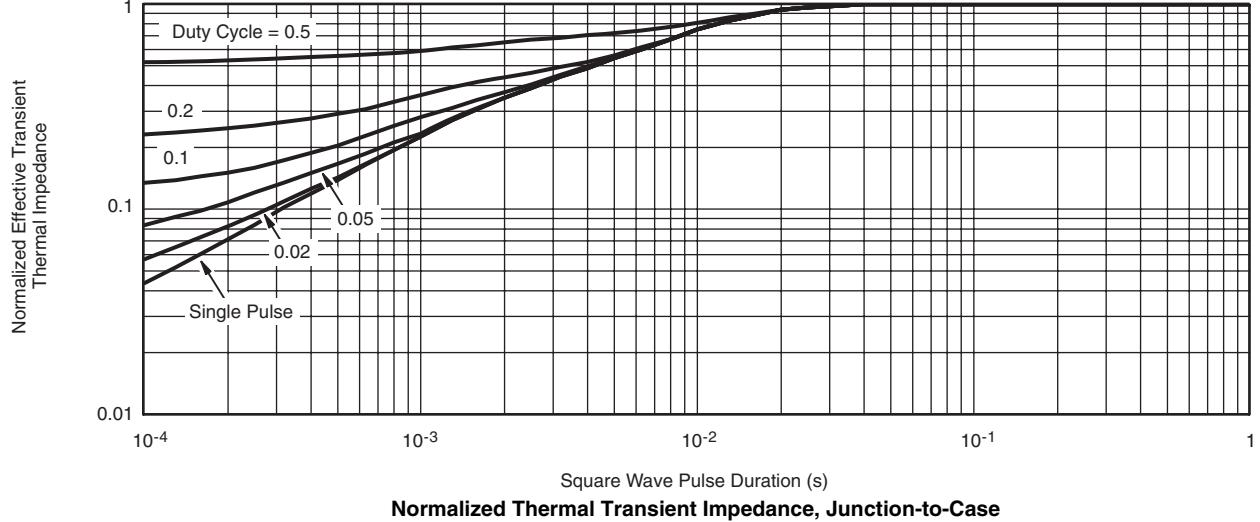
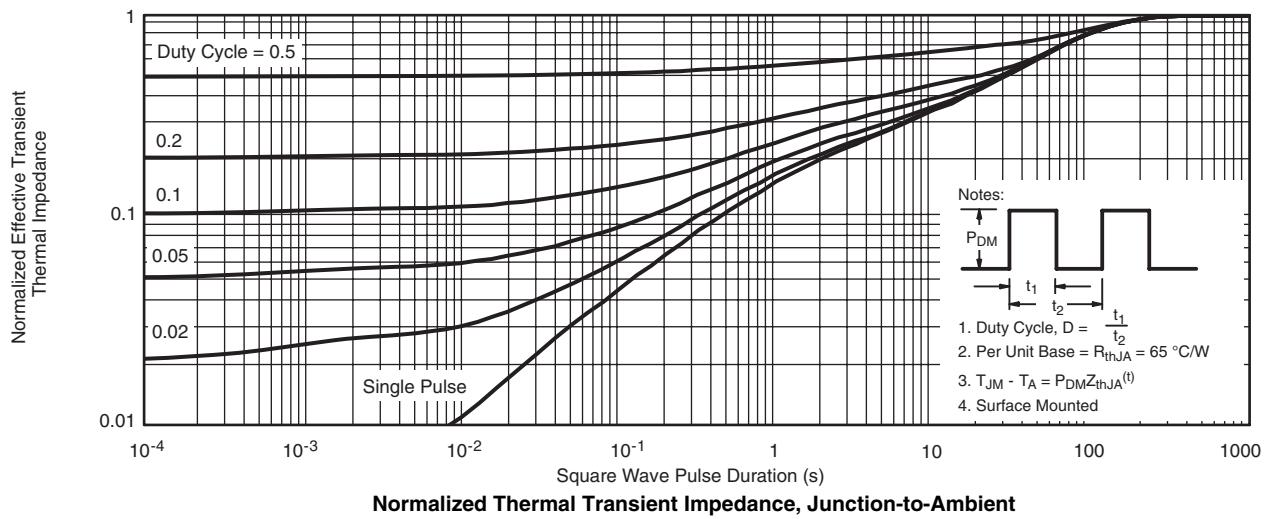
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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