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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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## N- and P-Channel 30V (D-S) Power MOSFET

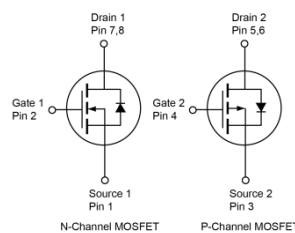
### FEATURES

- Low  $R_{DS(on)}$  to minimize conductive losses
- Low gate charge for fast power switching
- 100% UIS and  $R_g$  tested
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### APPLICATIONS

- DC-DC Converters
- Power Routing
- Motor Drives

KEY PERFORMANCE PARAMETERS			
PARAMETER	TYPE	VALUE	UNIT
$V_{DS}$	N-ch	30	V
	P-ch	-30	
$R_{DS(on)}$ (max)	N-ch	$V_{GS} = 10V$	16
		$V_{GS} = 4.5V$	20
	P-ch	$V_{GS} = -10V$	24
		$V_{GS} = -4.5V$	37
$Q_g$	N-ch	7	nC
	P-ch	11	



**Note:** MSL 1 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	N-ch	P-ch	UNIT
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 25$	V
Continuous Drain Current (Note 1)	$I_D$	$T_C = 25^\circ\text{C}$	15	13
		$T_A = 25^\circ\text{C}$	8	7
Pulsed Drain Current	$I_{DM}$	60	52	A
Single Pulse Avalanche Current (Note 2)	$I_{AS}$	12	18	A
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	21.6	48.6	mJ
Total Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	6	6
		$T_C = 125^\circ\text{C}$	1.2	1.2
Total Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	1.6	1.6
		$T_A = 125^\circ\text{C}$	0.3	0.3
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150		$^\circ\text{C}$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	21	$^\circ\text{C/W}$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	78	

**Thermal Performance Note:**  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins.  $R_{\theta JA}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)								
PARAMETER	CONDITIONS	SYMBOL	TYPE	MIN	TYP	MAX	UNIT	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	$BV_{DSS}$	N-ch	30	--	--	V	
	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$		P-ch	-30	--	--		
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	N-ch	1	1.4	2.5	V	
	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$		P-ch	-1	-1.7	-2.5		
Gate-Source Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	N-ch	--	--	$\pm 100$	nA	
	$V_{GS} = \pm 25\text{V}, V_{DS} = 0\text{V}$		P-ch	--	--	$\pm 100$	nA	
Drain-Source Leakage Current	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V}$	$I_{DSS}$	N-ch	--	--	1	$\mu\text{A}$	
	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V}$ $T_J = 125^\circ\text{C}$			--	--	100		
	$V_{GS} = 0\text{V}, V_{DS} = -30\text{V}$		P-ch	--	--	-1		
	$V_{GS} = 0\text{V}, V_{DS} = -30\text{V}$ $T_J = 125^\circ\text{C}$			--	--	-100		
Drain-Source On-State Resistance <sup>(Note 3)</sup>	$V_{GS} = 10\text{V}, I_D = 8\text{A}$	$R_{DS(on)}$	N-ch	--	10	16	m $\Omega$	
	$V_{GS} = 4.5\text{V}, I_D = 8\text{A}$			--	13	20		
	$V_{GS} = -10\text{V}, I_D = -7\text{A}$		P-ch	--	18	24		
	$V_{GS} = -4.5\text{V}, I_D = -7\text{A}$			--	30	37		
Forward Transconductance <sup>(Note 3)</sup>	$V_{DS} = 5\text{V}, I_D = 8\text{A}$	$g_{fs}$	N-ch	--	26	--	S	
	$V_{DS} = -5\text{V}, I_D = -7\text{A}$		P-ch	--	16	--		
<b>Dynamic</b> <sup>(Note 4)</sup>								
Total Gate Charge	N-ch $V_{DS} = 15\text{V}, I_D = 8\text{A}$ P-ch $V_{DS} = -15\text{V}, I_D = -7\text{A}$	$Q_{g(VGS=10V)}$	N-ch	--	14	--	nC	
			P-ch	--	21.5	--		
Total Gate Charge		$Q_{g(VGS=4.5V)}$	N-ch	--	7	--		
			P-ch	--	11	--		
Gate-Source Charge		$Q_{gs}$	N-ch	--	1.7	--		
			P-ch	--	3.4	--		
Gate-Drain Charge		$Q_{gd}$	N-ch	--	3.7	--		
			P-ch	--	5.3	--		
Input Capacitance	N-ch $V_{GS} = 0\text{V}, V_{DS} = 15\text{V}$	$C_{iss}$	N-ch	--	646	--	pF	
			P-ch	--	1089	--		
Output Capacitance	f = 1.0MHz P-ch	$C_{oss}$	N-ch	--	108	--		
			P-ch	--	190	--		
Reverse Transfer Capacitance	$V_{GS} = 0\text{V}, V_{DS} = -15\text{V}$ f = 1.0MHz	$C_{rss}$	N-ch	--	70	--		
			P-ch	--	119	--		
Gate Resistance	f = 1.0MHz	$R_g$	N-ch	0.9	3	6		$\Omega$
			P-ch	3.6	12	24		



<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)							
PARAMETER	CONDITIONS	SYMBOL	TYPE	MIN	TYP	MAX	UNIT
<b>Switching</b> (Note 4)							
Turn-On Delay Time	N-ch	$t_{d(on)}$	N-ch	--	5.4	--	ns
			P-ch	--	6.2	--	
Turn-On Rise Time	$V_{GS} = 10\text{V}, V_{DS} = 15\text{V}, I_D = 8\text{A}, R_G = 2\Omega$	$t_r$	N-ch	--	41.3	--	
			P-ch	--	40.4	--	
Turn-Off Delay Time	P-ch	$t_{d(off)}$	N-ch	--	18	--	
			P-ch	--	45.4	--	
Turn-Off Fall Time	$I_D = -7\text{A}, R_G = 2\Omega$	$t_f$	N-ch	--	5.6	--	
			P-ch	--	45.4	--	
<b>Source-Drain Diode</b>							
Forward Voltage (Note 3)	$V_{GS} = 0\text{V}, I_S = 8\text{A}$	$V_{SD}$	N-ch	--	--	1	V
	$V_{GS} = 0\text{V}, I_S = -7\text{A}$		P-ch	--	--	-1	
Reverse Recovery Time	N-ch $I_S = 8\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	$t_{rr}$	N-ch	--	14	--	ns
			P-ch	--	32	--	
Reverse Recovery Charge	P-ch $I_S = -7\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	$Q_{rr}$	N-ch	--	4	--	nC
			P-ch	--	10	--	

**Notes:**

- Silicon limited current only.
- N-ch :  $L = 0.3\text{mH}, V_{GS} = 10\text{V}, V_{DD} = 25\text{V}, R_G = 25\Omega, I_{AS} = 12\text{A}$ , Starting  $T_J = 25^\circ\text{C}$   
 P-ch :  $L = 0.3\text{mH}, V_{GS} = 10\text{V}, V_{DD} = 25\text{V}, R_G = 25\Omega, I_{AS} = 18\text{A}$ , Starting  $T_J = 25^\circ\text{C}$
- Pulse test: Pulse Width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Switching time is essentially independent of operating temperature.

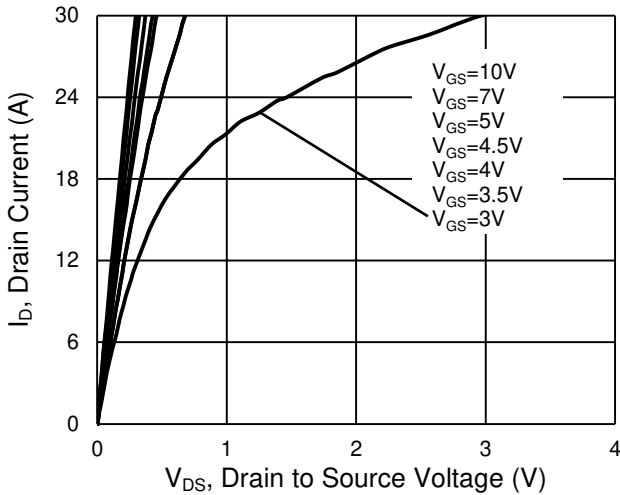
**ORDERING INFORMATION**

PART NO.	PACKAGE	PACKING
TSM8568CS RLG	SOP-8	2,500pcs / 13" Reel

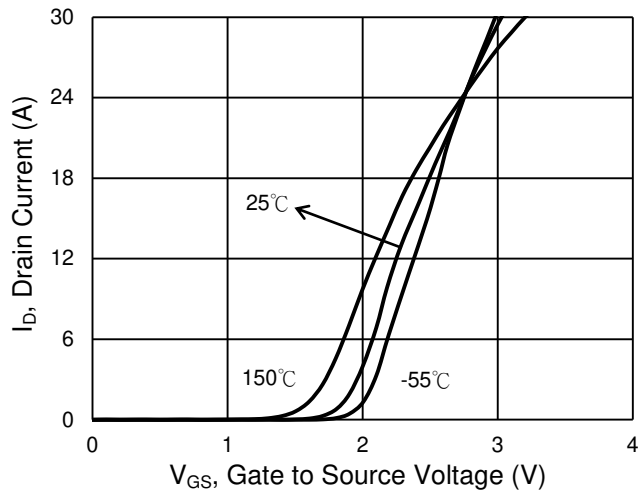
**CHARACTERISTICS CURVES (N-Channel)**

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

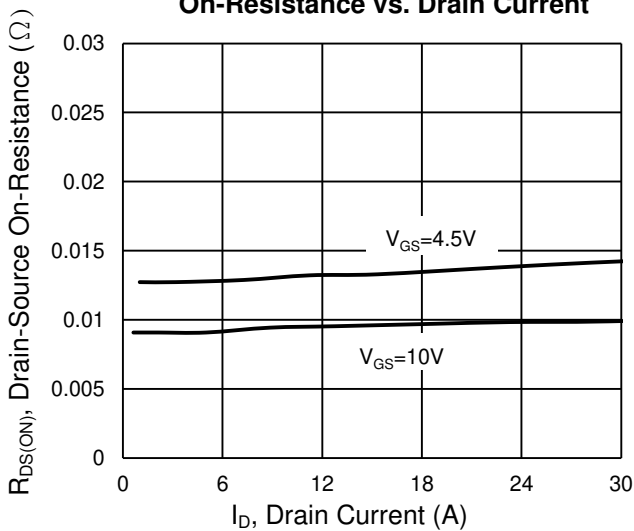
**Output Characteristics**



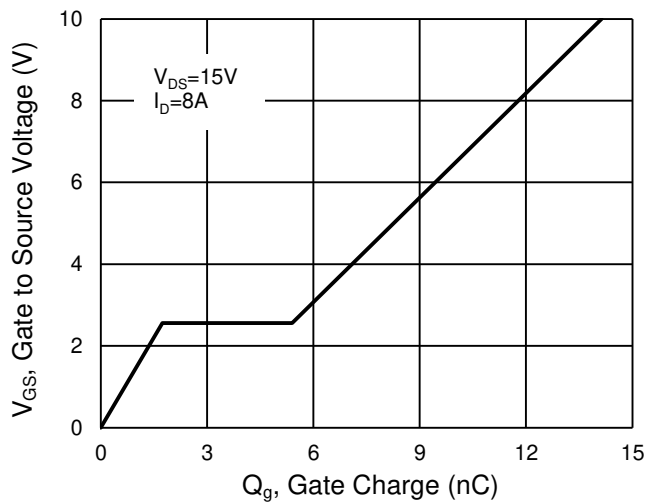
**Transfer Characteristics**



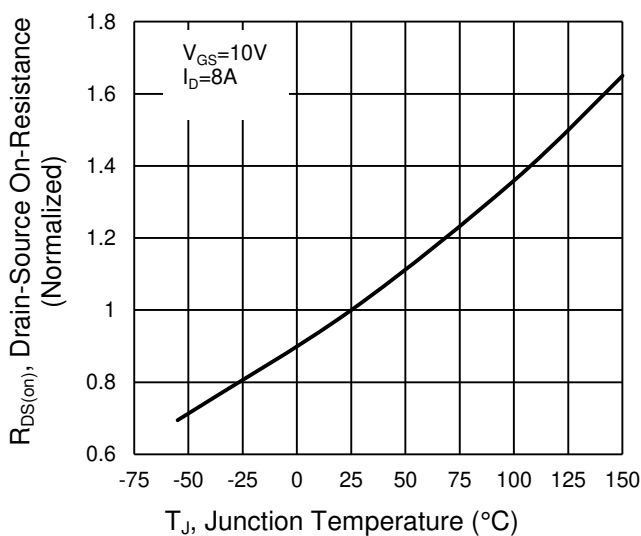
**On-Resistance vs. Drain Current**



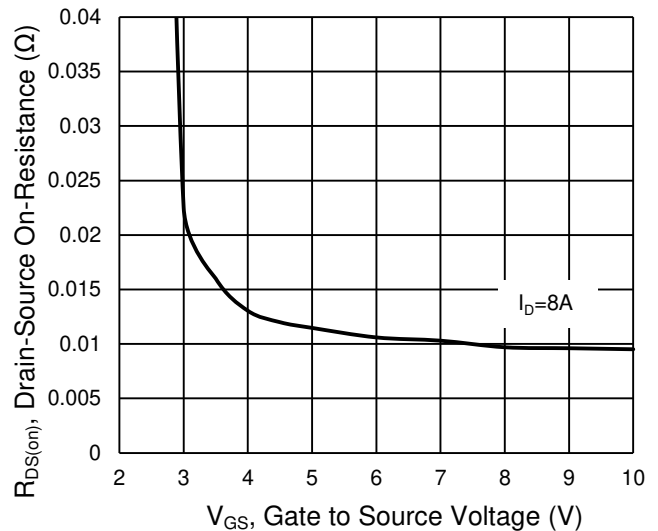
**Gate-Source Voltage vs. Gate Charge**



**On-Resistance vs. Junction Temperature**

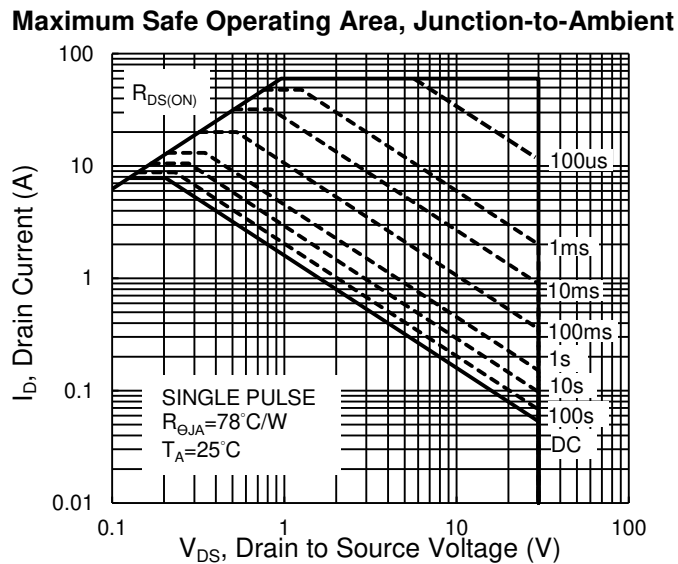
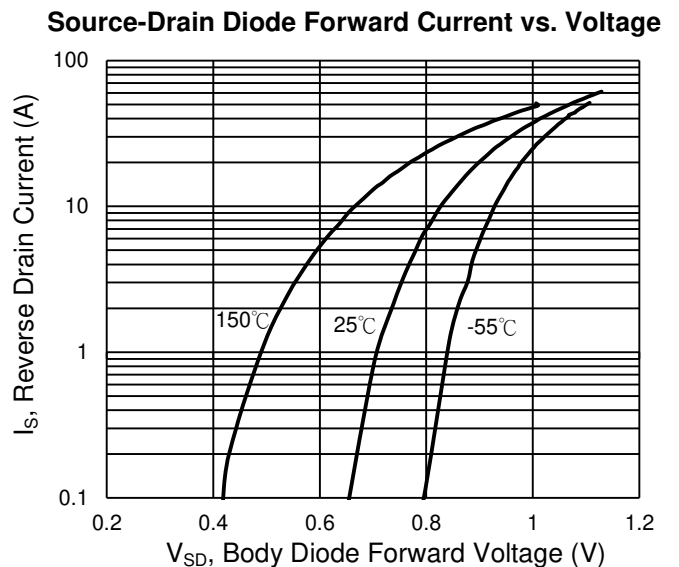
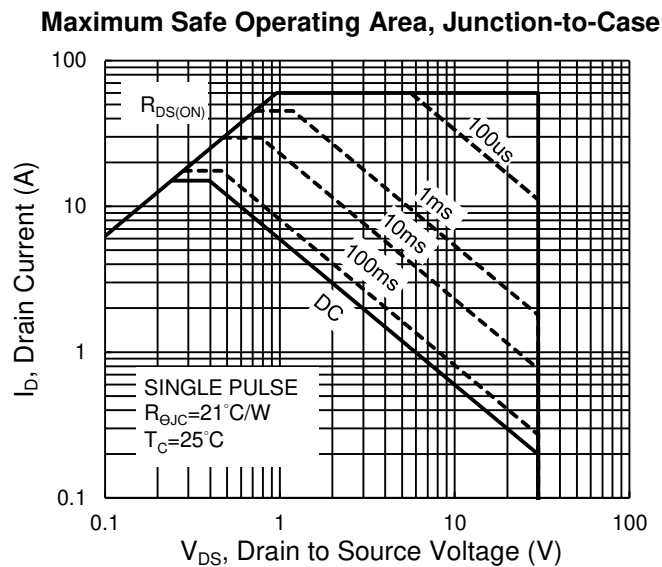
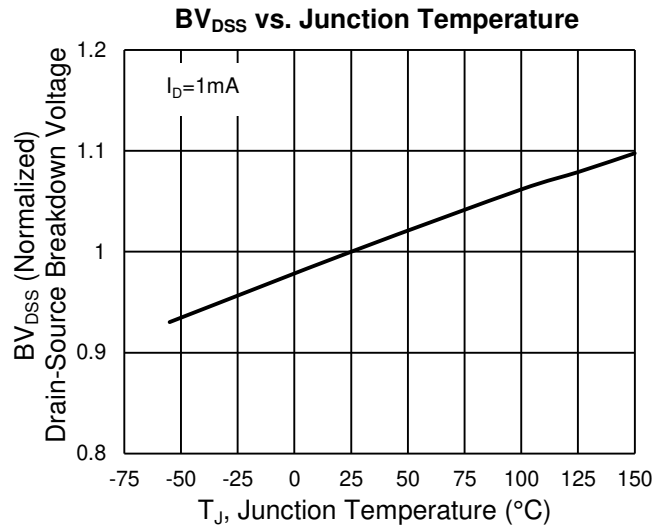
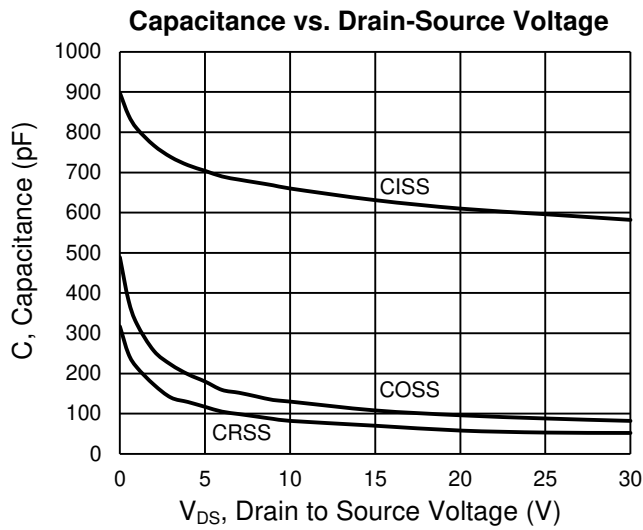


**On-Resistance vs. Gate-Source Voltage**

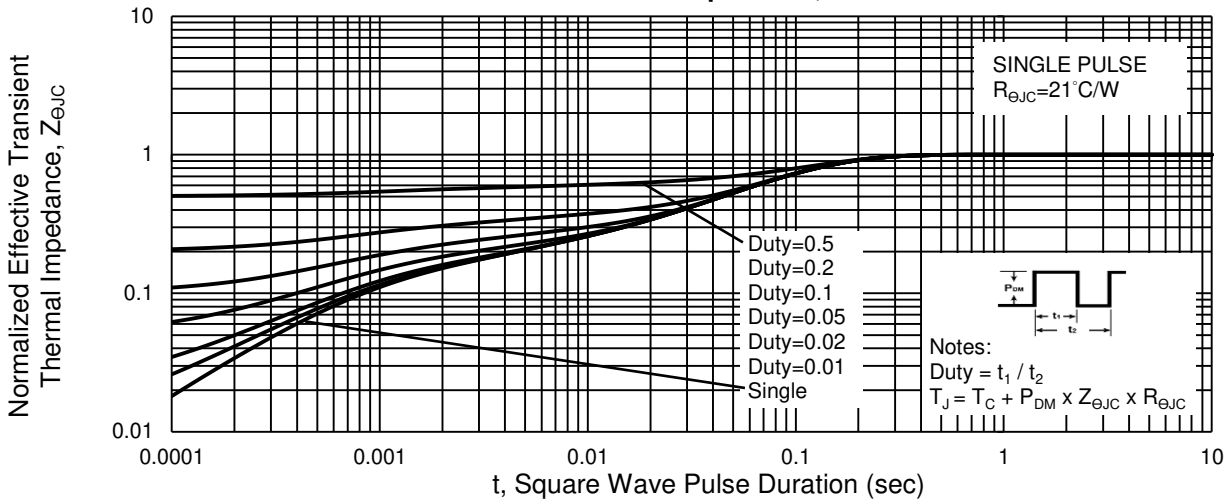


**CHARACTERISTICS CURVES (N-Channel)**

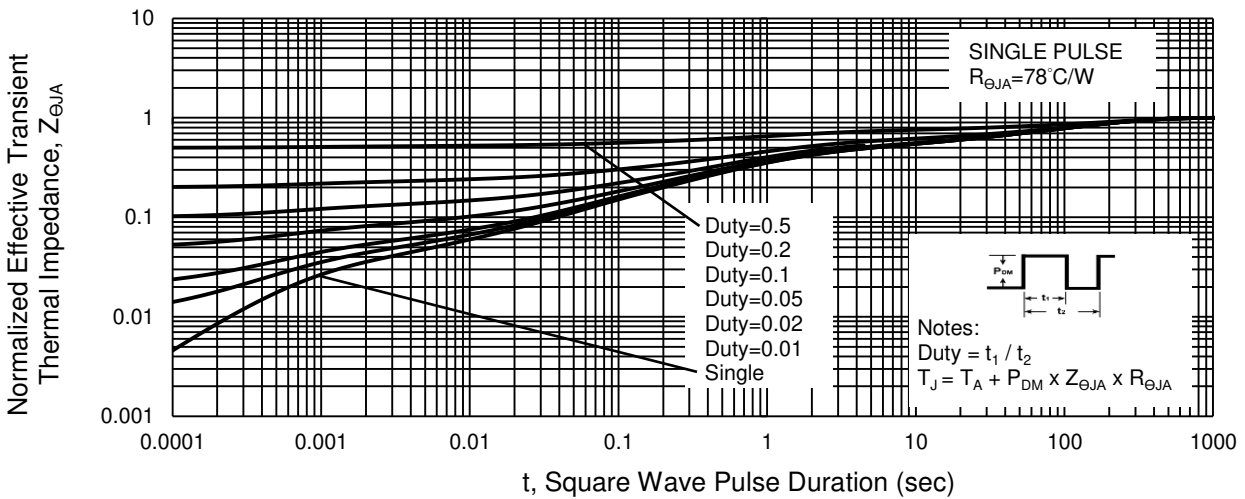
( $T_A = 25^\circ\text{C}$  unless otherwise noted)



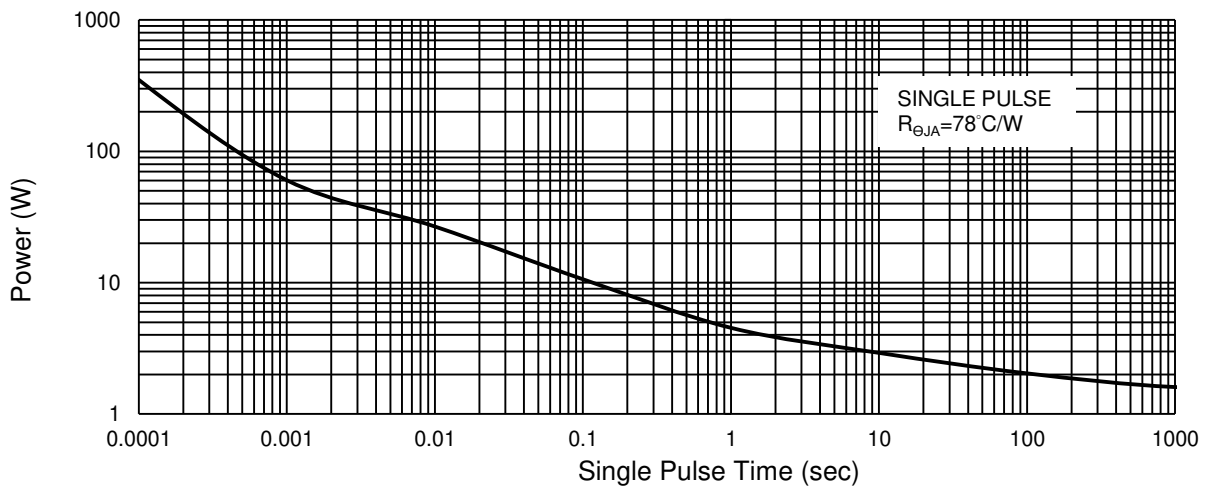
**Normalized Thermal Transient Impedance, Junction-to-Case**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**



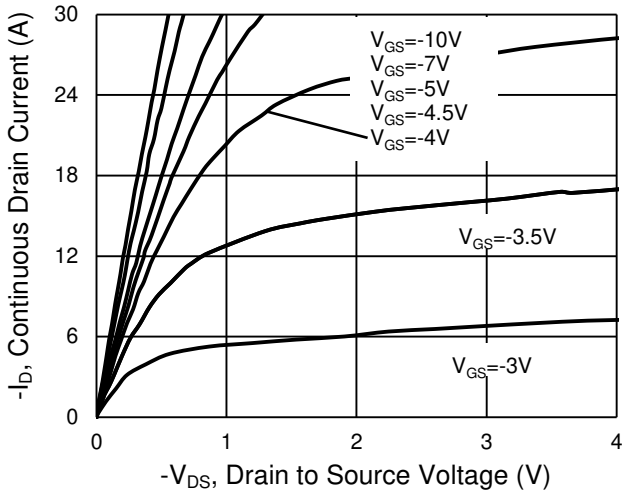
**Single Pulse Maximum Power Dissipation, Junction-to-Ambient**



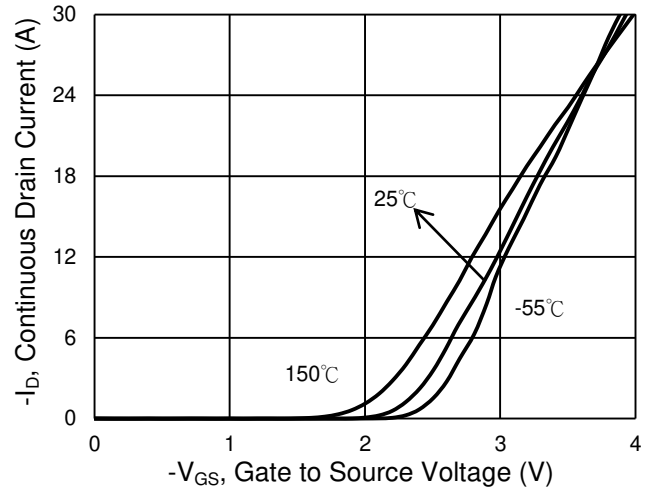
**CHARACTERISTICS CURVES (P-Channel)**

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

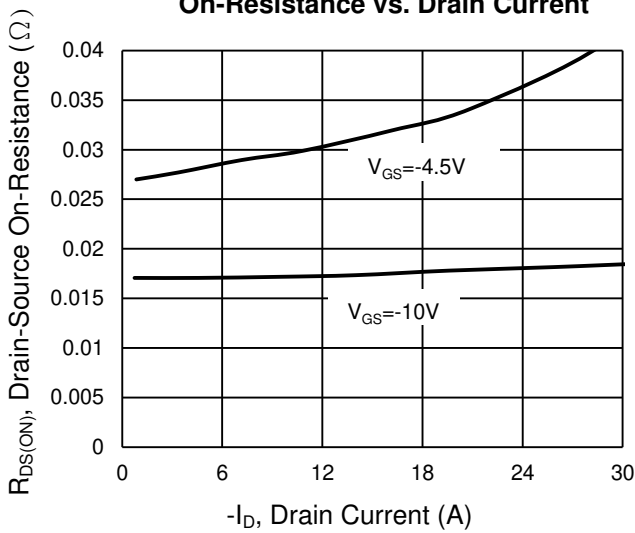
**Output Characteristics**



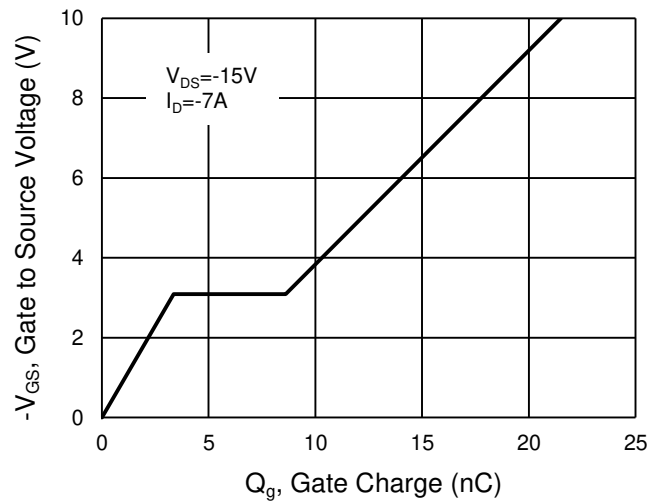
**Transfer Characteristics**



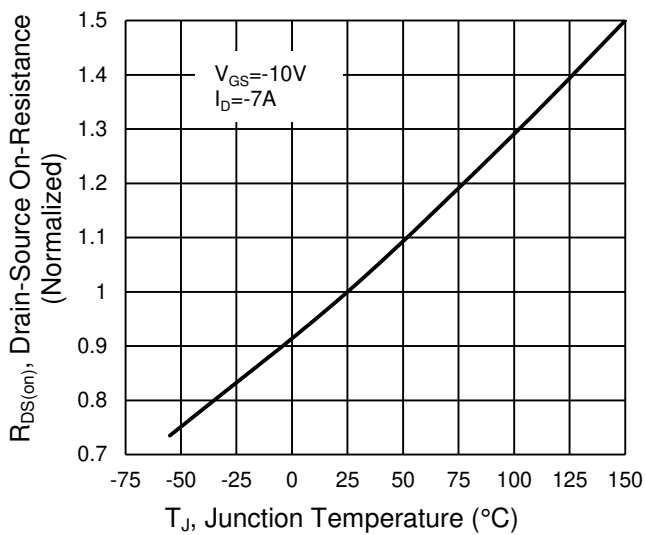
**On-Resistance vs. Drain Current**



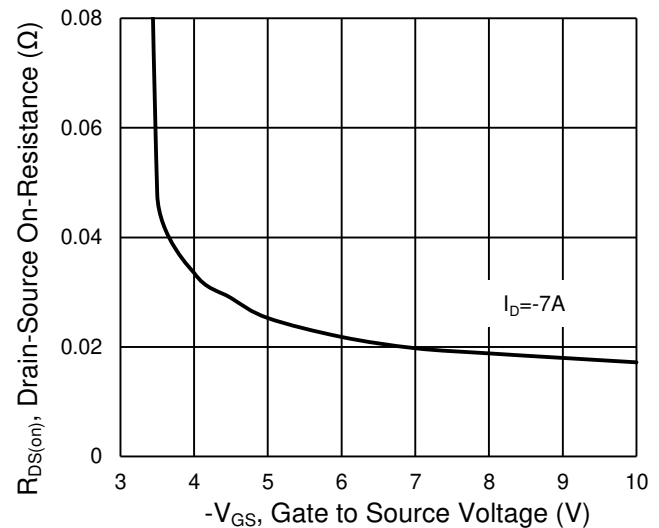
**Gate-Source Voltage vs. Gate Charge**



**On-Resistance vs. Junction Temperature**



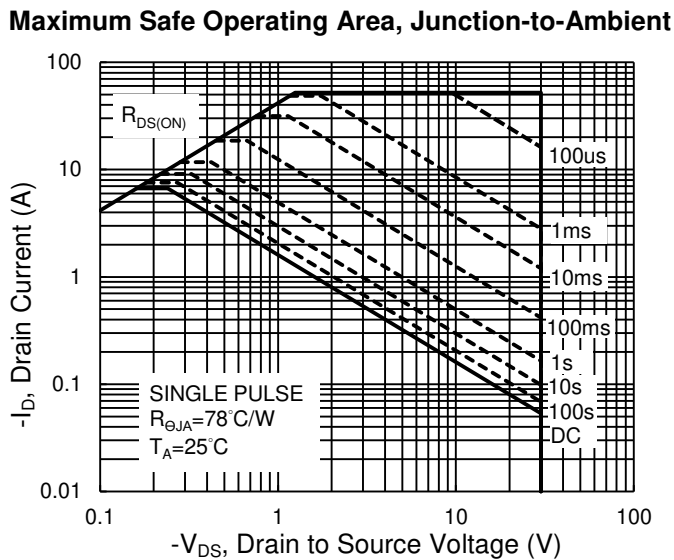
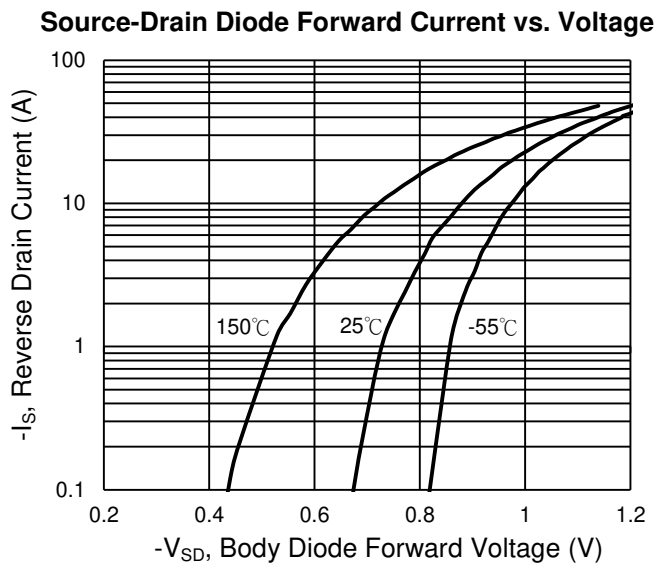
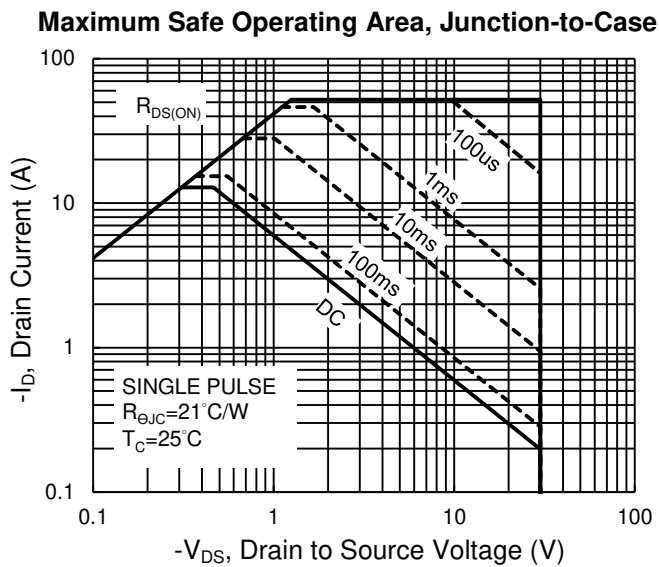
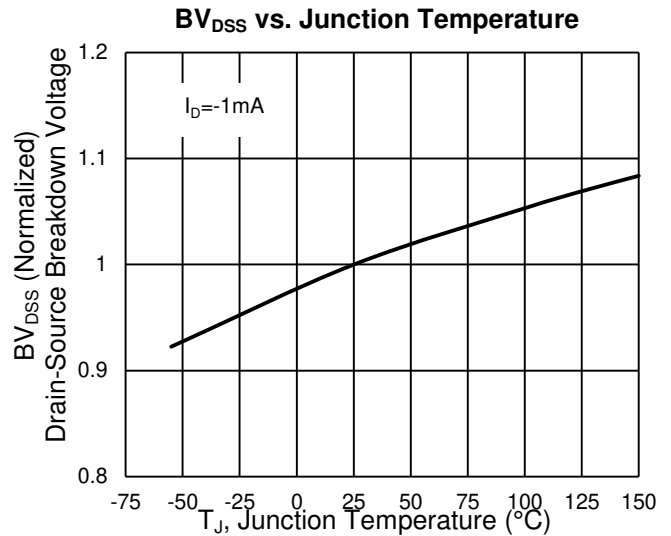
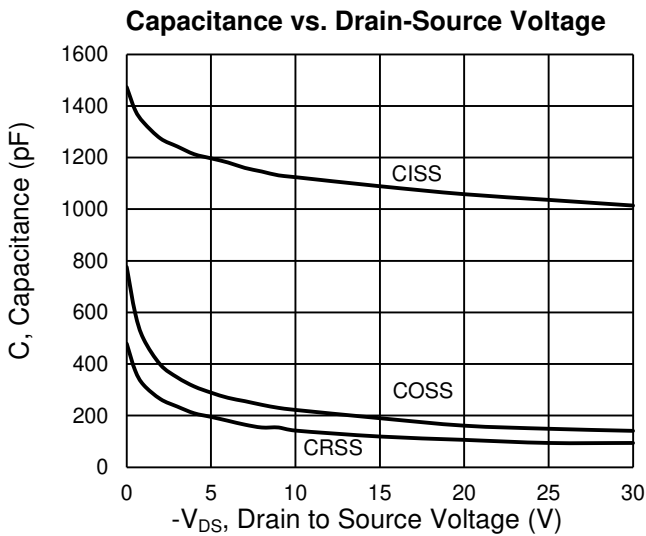
**On-Resistance vs. Gate-Source Voltage**



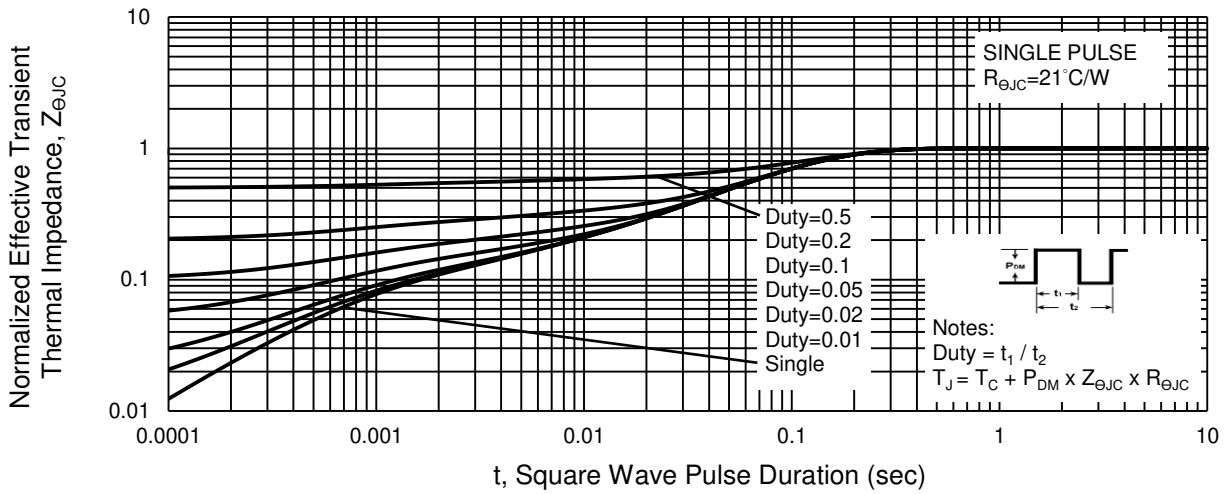


**CHARACTERISTICS CURVES (P-Channel)**

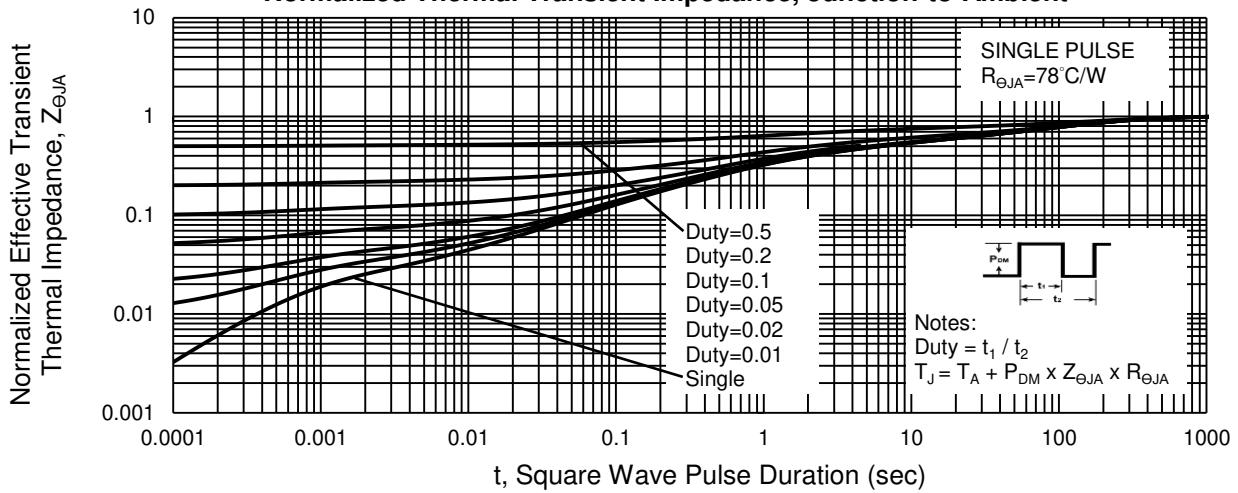
( $T_A = 25^\circ\text{C}$  unless otherwise noted)



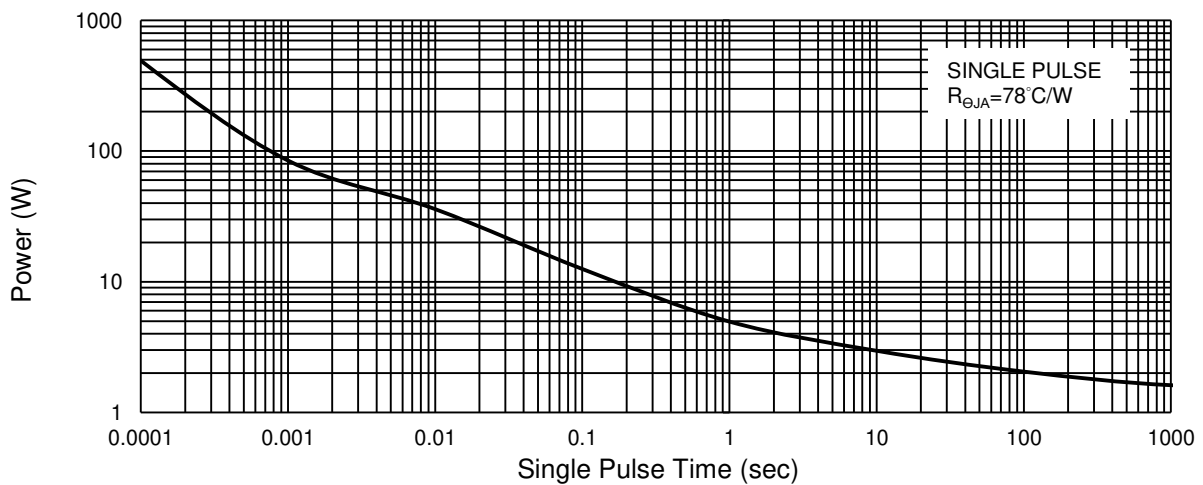
**Normalized Thermal Transient Impedance, Junction-to-Case**



**Normalized Thermal Transient Impedance, Junction-to-Ambient**

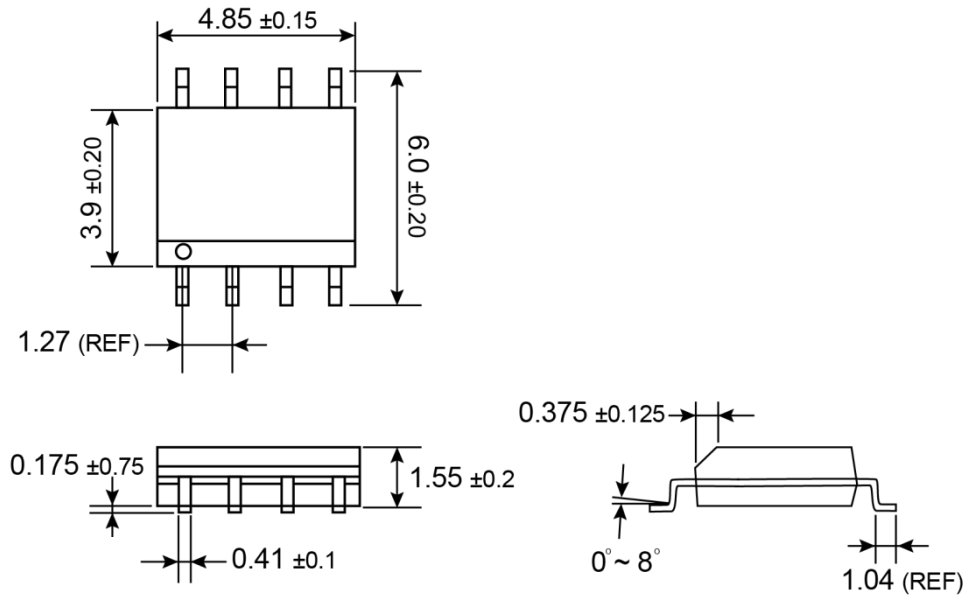


**Single Pulse Maximum Power Dissipation, Junction-to-Ambient**

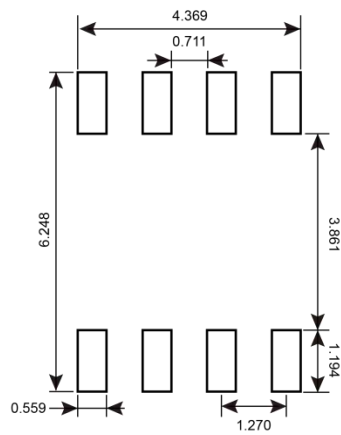


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

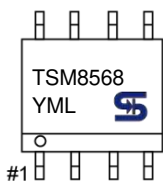
**SOP-8**



**SUGGESTED PAD LAYOUT** (Unit: Millimeters)



**MARKING DIAGRAM**



- Y** = Year Code
- M** = Month Code
- O** =Jan    **P** =Feb    **Q** =Mar    **R** =Apr
- S** =May    **T** =Jun    **U** =Jul    **V** =Aug
- W** =Sep    **X** =Oct    **Y** =Nov    **Z** =Dec
- L** = Lot Code (1~9, A~Z)

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