

N-Channel Power MOSFET

60V, 11A, 90mΩ

FEATURES

- 100% UIS and Rg tested
- Logic-level gate drive
- Fast switching
- RoHS Compliant
- Halogen-Free according to IEC 61249-2-21

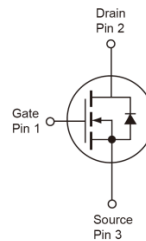
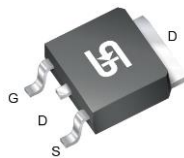
APPLICATIONS

- DC-DC Converters
- Solenoid and Motor Drivers

PRODUCT SUMMARY			
PARAMETER	VALUE	UNIT	
V_{DS}	60	V	
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	90	mΩ
	$V_{GS} = 4.5V$	100	
Q_g	$V_{GS} = 10V$	9.5	nC



TO-252 (DPAK)



Note: MSL 3 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^(Note 1)	I_D	$T_C = 25^\circ\text{C}$	11
		$T_C = 100^\circ\text{C}$	7
Pulsed Drain Current ^(Note 2)	I_{DM}	44	A
Single Pulse Avalanche Current ^(Note 3)	I_{AS}	7	A
Single Pulse Avalanche Energy ^(Note 3)	E_{AS}	25	mJ
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	25
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL RESISTANCE			
PARAMETER	SYMBOL	MAXIMUM	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	5	$^\circ\text{C/W}$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	62	$^\circ\text{C/W}$

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. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	1.2	1.8	2.5	V
Gate-Source Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0\text{V}, V_{DS} = 60\text{V}$	I_{DSS}	--	--	1	μA
	$V_{GS} = 0\text{V}, V_{DS} = 48\text{V}$ $T_J = 125^\circ\text{C}$		--	--	10	
Drain-Source On-State Resistance (Note 4)	$V_{GS} = 10\text{V}, I_D = 6\text{A}$	$R_{DS(on)}$	--	76	90	m Ω
	$V_{GS} = 4.5\text{V}, I_D = 3\text{A}$		--	87	100	
Forward Transconductance (Note 4)	$V_{DS} = 10\text{V}, I_D = 3\text{A}$	g_{fs}	--	4	--	S
Dynamic						
Total Gate Charge	$V_{GS} = 10\text{V}, V_{DS} = 48\text{V},$ $I_D = 6\text{A}$	Q_g	--	9.5	--	nC
Gate-Source Charge		Q_{gs}	--	2	--	
Gate-Drain Charge		Q_{gd}	--	1.4	--	
Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V},$ $f = 1.0\text{MHz}$	C_{iss}	--	553.4	--	pF
Output Capacitance		C_{oss}	--	34.4	--	
Reverse Transfer Capacitance		C_{rss}	--	27	--	
Gate Resistance	$f = 1.0\text{MHz}$	R_g	--	2	--	Ω
Switching (Note 5)						
Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 30\text{V},$ $I_D = 1\text{A}, R_G = 3.3\Omega$	$t_{d(on)}$	--	6.7	--	ns
Rise Time		t_r	--	2.8	--	
Turn-Off Delay Time		$t_{d(off)}$	--	17.1	--	
Fall Time		t_f	--	1.8	--	
Source-Drain Diode						
Diode Forward Voltage (Note 4)	$V_{GS} = 0\text{V}, I_S = 1\text{A}$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_S = 2\text{A}, V_{GS} = 30\text{V}$ $di/dt = 100\text{A}/\mu\text{s}$	t_{rr}	--	12.5	--	ns
Reverse Recovery Charge		Q_{rr}	--	7.7	--	nC

Notes:

- Limited by maximum junction temperature.
- Repetitive Rating : Pulsed width limited by maximum junction temperature.
- $L = 1\text{mH}, V_{GS} = 10\text{V}, R_G = 25\Omega$, 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.

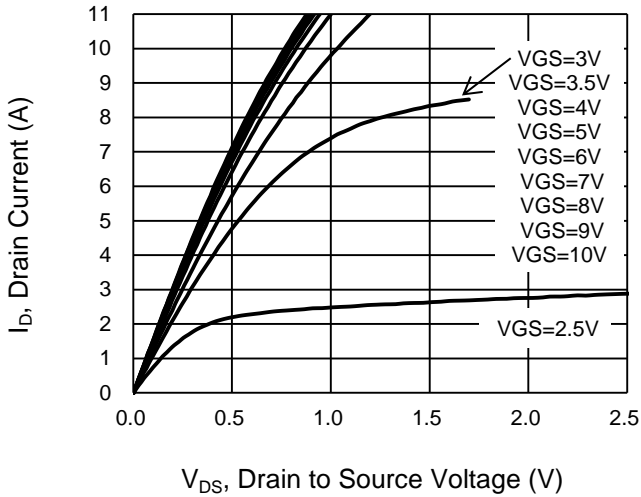
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM900N06CP ROG	TO-252	2.5kpcs / 13" Reel

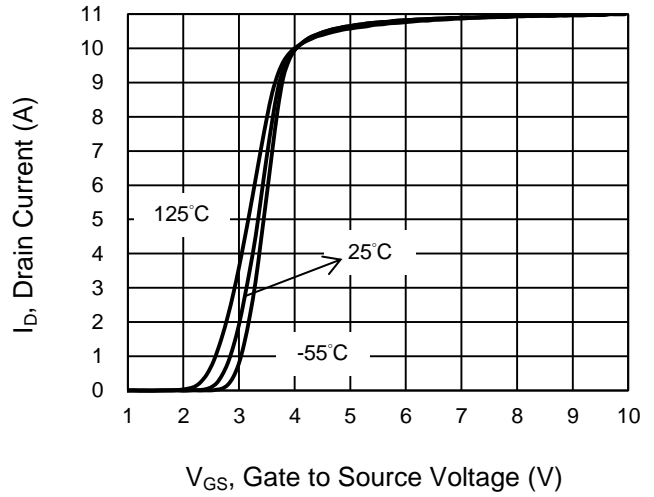
CHARACTERISTICS CURVES

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

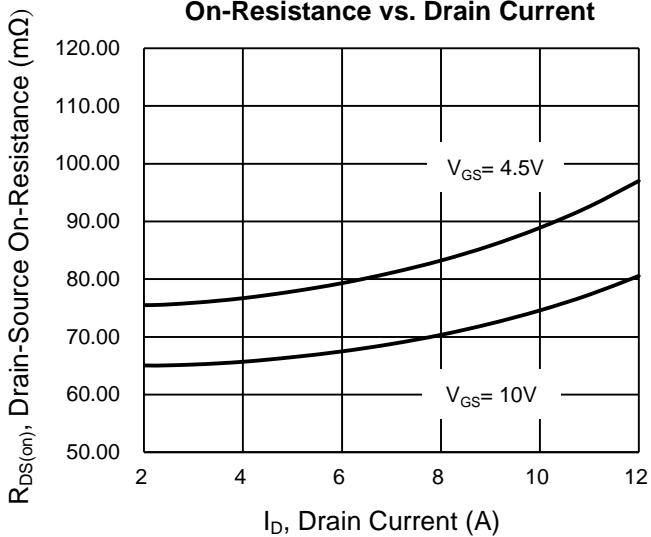
Output Characteristics



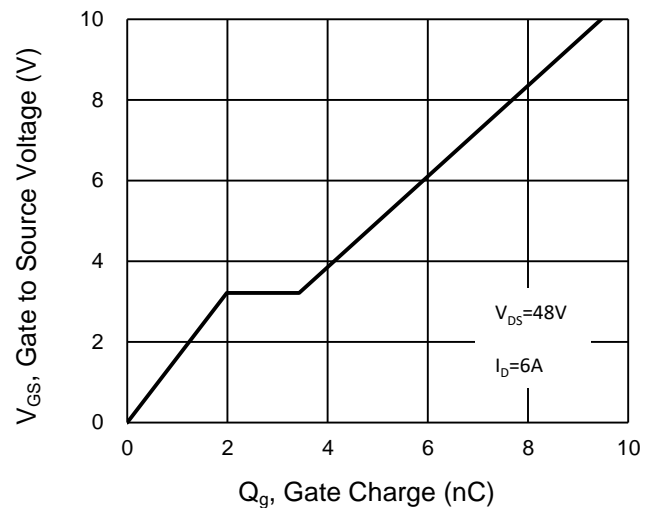
Transfer Characteristics



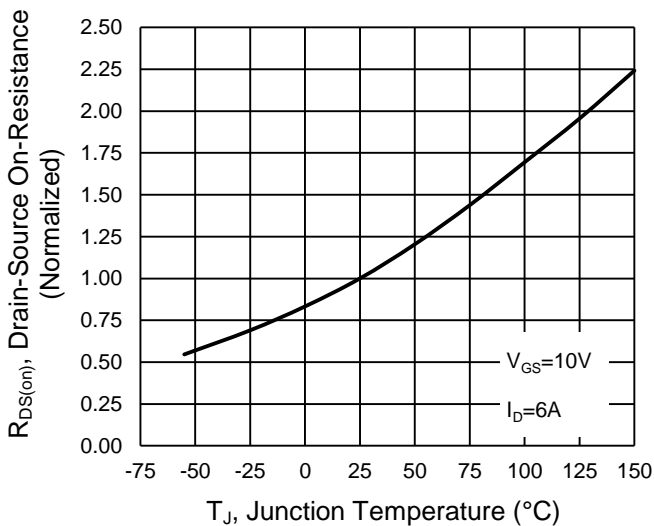
On-Resistance vs. Drain Current



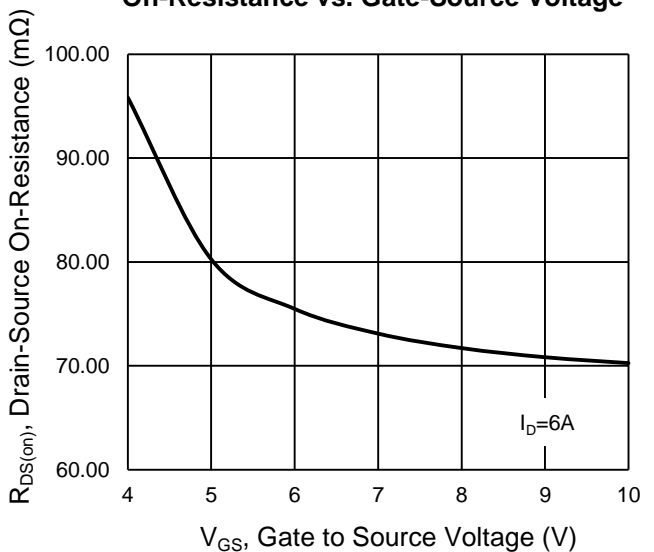
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature

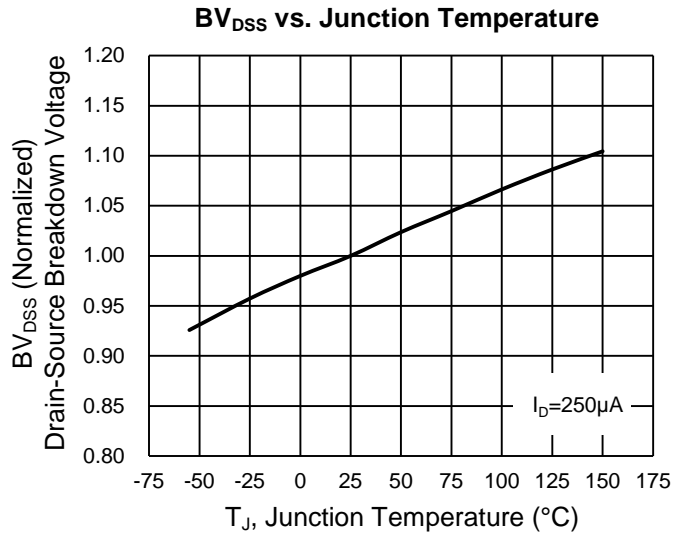
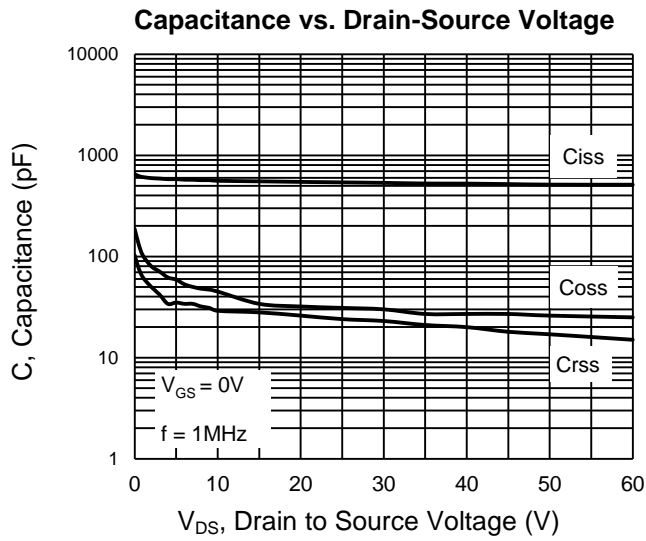


On-Resistance vs. Gate-Source Voltage

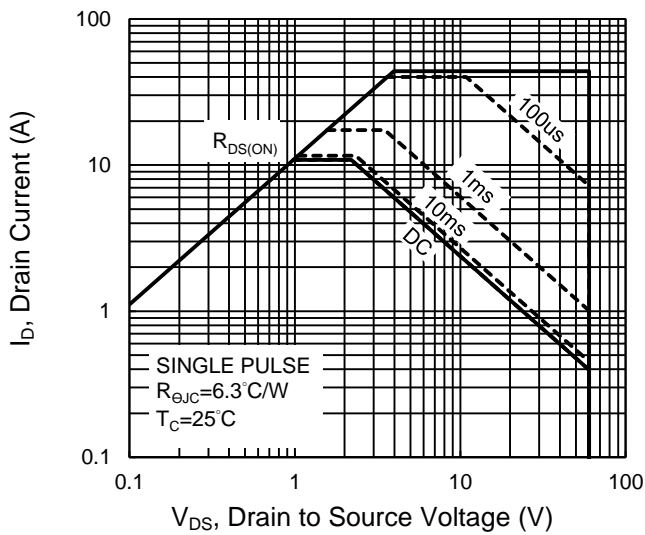


CHARACTERISTICS CURVES

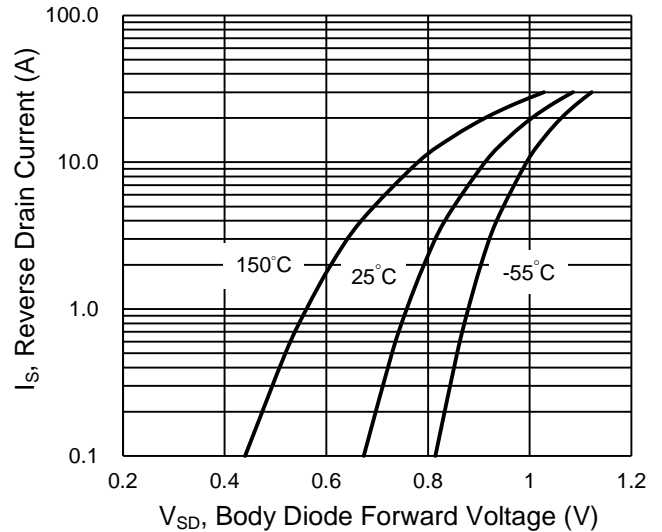
($T_A = 25^\circ\text{C}$ unless otherwise noted)



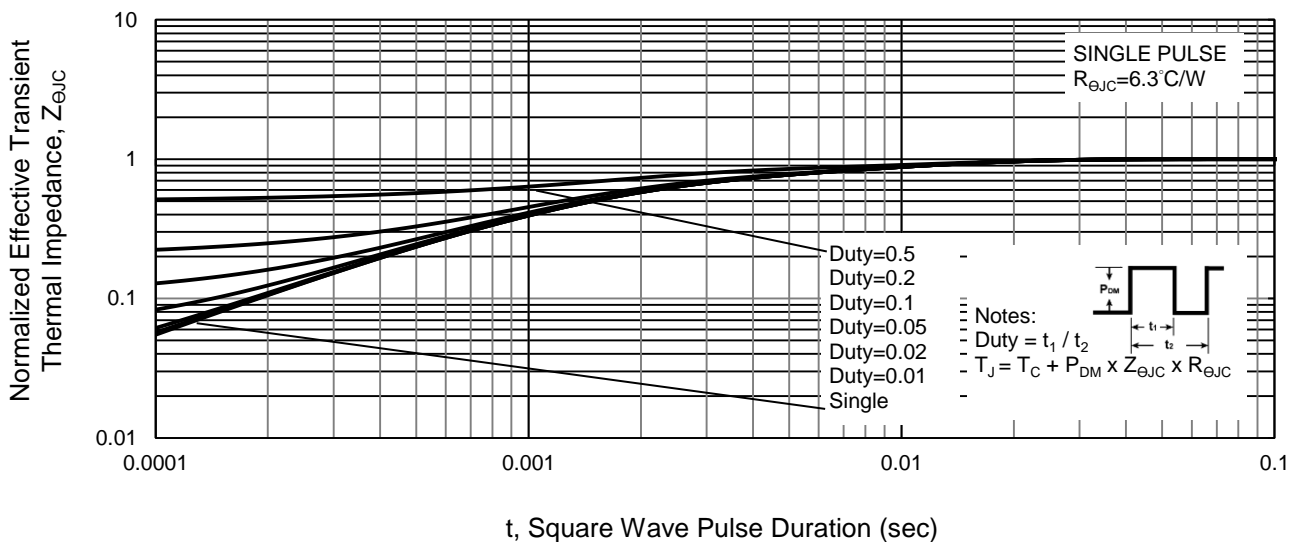
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



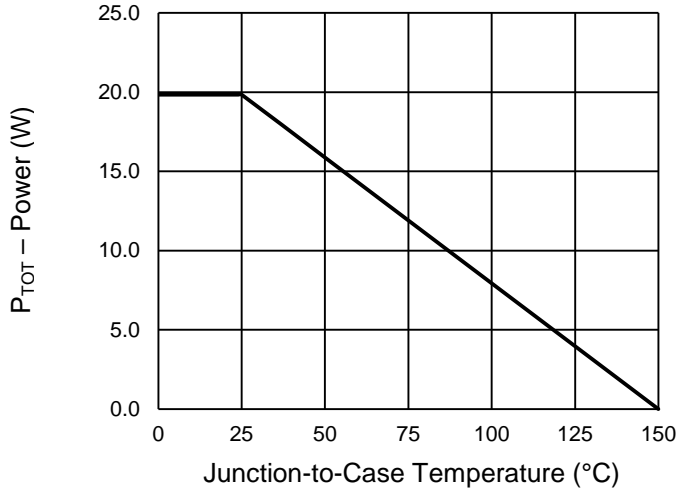
Normalized Thermal Transient Impedance, Junction-to-Cas



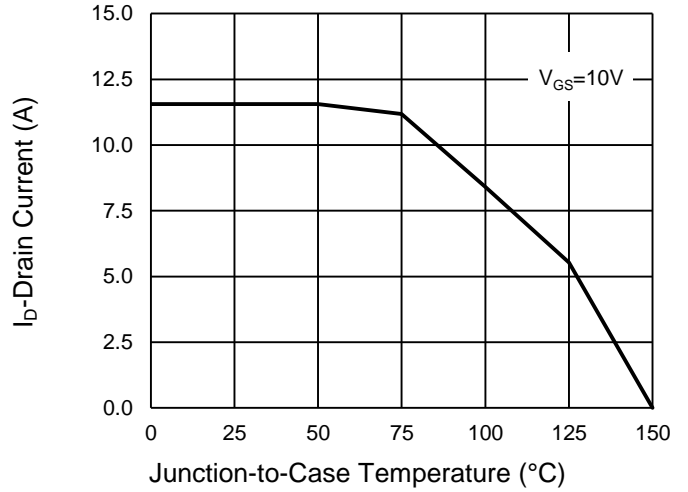
CHARACTERISTICS CURVES

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

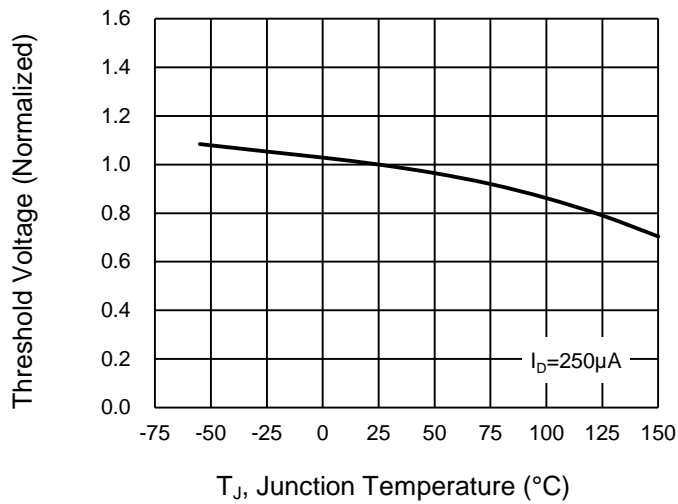
Power Dissipation



Drain Current

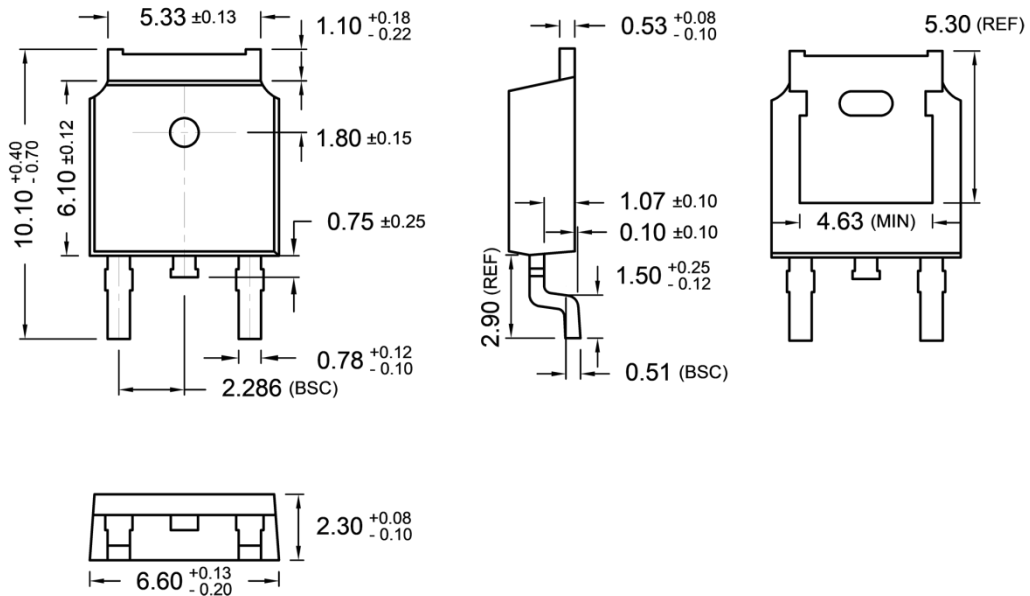


Normalized gate threshold voltage vs Temperature

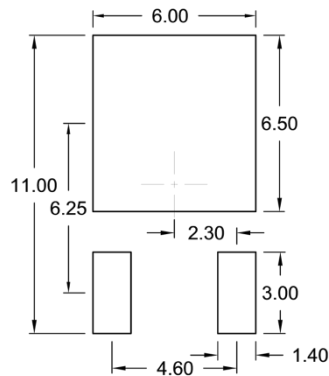


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-252 (DPAK)



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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