

P-Channel Power MOSFET
-20V, -11A, 16mΩ

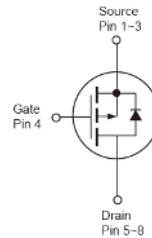
FEATURES

- Fast Switching
- Suitable for 1.8V drive applications
- RoHS compliant
- Halogen-free according to IEC 61249-2-21

APPLICATIONS

- Load Switch
- Networking

PRODUCT SUMMARY			
PARAMETER	VALUE	UNIT	
V_{DS}	-20	V	
$R_{DS(on)}$ (max)	$V_{GS} = -4.5V$	16	mΩ
	$V_{GS} = -2.5V$	22	
	$V_{GS} = -1.8V$	28	
Q_g	$V_{GS} = 4.5V$	24	nC



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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V_{DS}	-20	V	
Gate-Source Voltage	V_{GS}	± 10	V	
Continuous Drain Current, Silicon limited	$T_C = 25^\circ C$	I_D	-14	A
Continuous Drain Current (Note 1)	$T_C = 25^\circ C$	I_D	-11	A
	$T_C = 100^\circ C$		-7	
Pulsed Drain Current (Note 2)		I_{DM}	-44	A
Total Power Dissipation	$T_C = 25^\circ C$	P_D	5	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	$^\circ C$

THERMAL RESISTANCE			
PARAMETER	SYMBOL	MAXIMUM	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	25	$^\circ C/W$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	50	$^\circ C/W$

Notes: $R_{\theta JA}$ 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. $R_{\theta JA}$ shown below for single device operation on FR-4 PCB in still air.

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}	-20	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250\mu\text{A}$	$V_{GS(TH)}$	-0.3	-0.5	-1.0	V
Gate-Source Leakage Current	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 100	nA
Drain-Source Leakage Current	$V_{GS} = 0\text{V}, V_{DS} = -20\text{V}$	I_{DSS}	--	--	-1	μA
Drain-Source On-State Resistance (Note 3)	$V_{GS} = -4.5\text{V}, I_D = -6\text{A}$	$R_{DS(on)}$	--	13	16	m Ω
	$V_{GS} = -2.5\text{V}, I_D = -4\text{A}$		--	16	22	
	$V_{GS} = -1.8\text{V}, I_D = -3\text{A}$		--	22	28	
Dynamic (Note 4)						
Total Gate Charge	$V_{DS} = -10\text{V}, I_D = -6\text{A},$ $V_{GS} = -4.5\text{V}$	Q_g	--	24	--	nC
Gate-Source Charge		Q_{gs}	--	3.4	--	
Gate-Drain Charge		Q_{gd}	--	4	--	
Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = -15\text{V},$ $f = 1.0\text{MHz}$	C_{iss}	--	2565	--	pF
Output Capacitance		C_{oss}	--	232	--	
Reverse Transfer Capacitance		C_{rss}	--	120	--	
Switching (Note 5)						
Turn-On Delay Time	$V_{GS} = -4.5\text{V},$ $V_{DD} = -10\text{V},$ $I_D = -1\text{A}, R_{GEN} = 25\Omega$	$t_{d(on)}$	--	12	--	ns
Rise Time		t_r	--	18	--	
Turn-Off Delay Time		$t_{d(off)}$	--	153	--	
Fall Time		t_f	--	60	--	
Source-Drain Diode						
Diode Forward Voltage (Note 3)	$V_{GS} = 0\text{V}, I_S = -1\text{A}$	V_{SD}	--	--	-1	V

Notes:

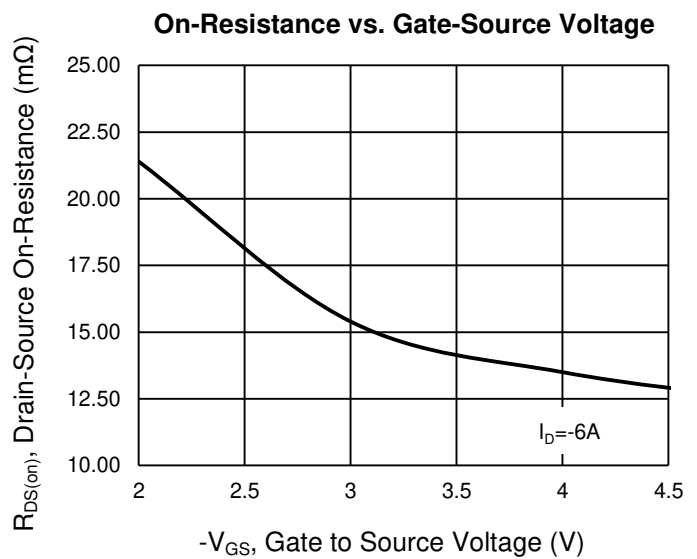
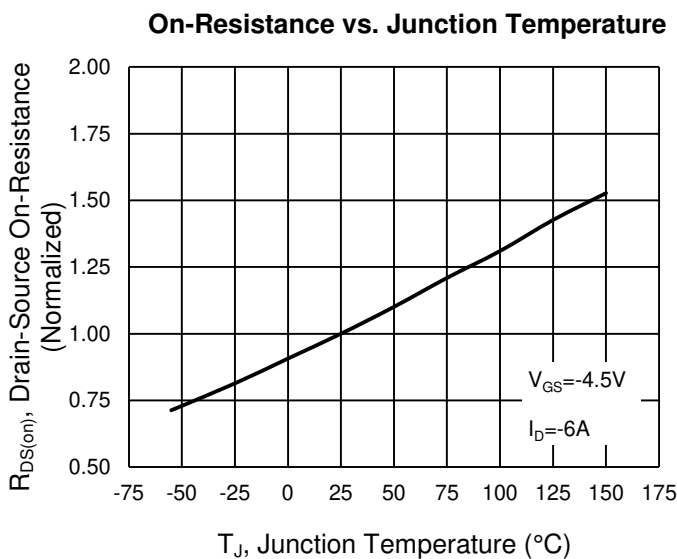
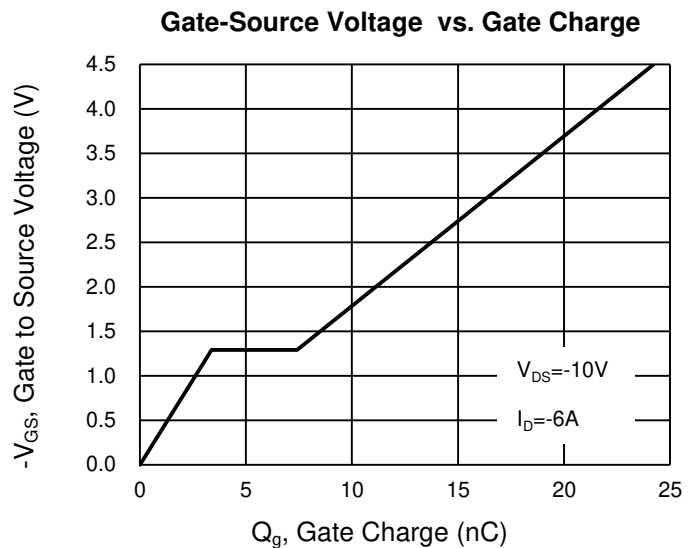
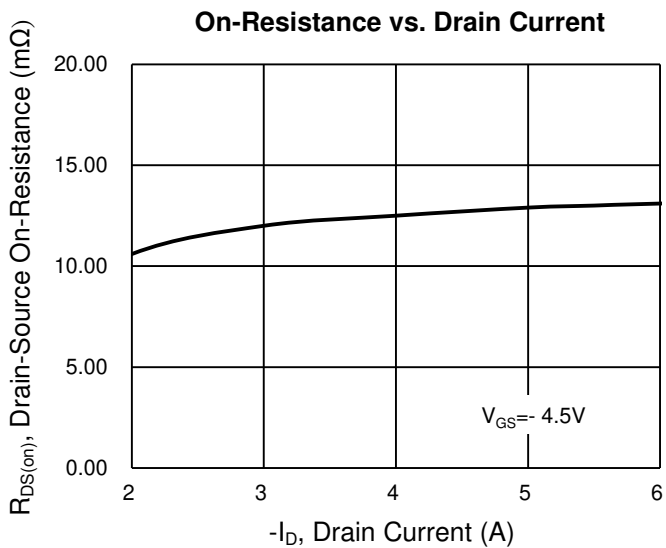
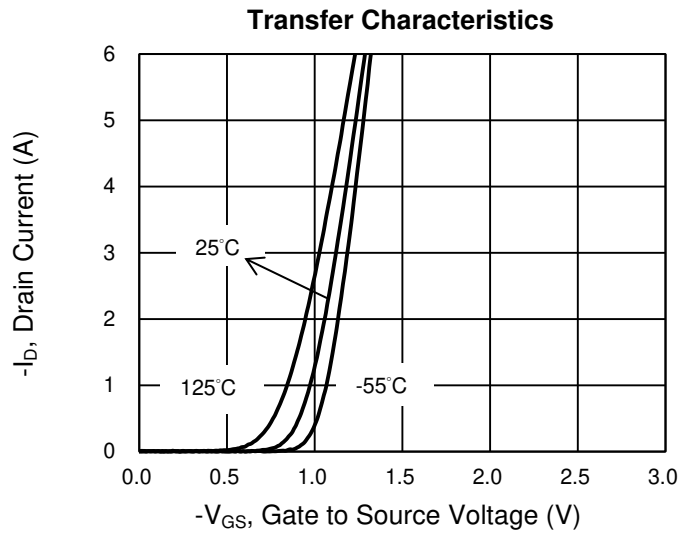
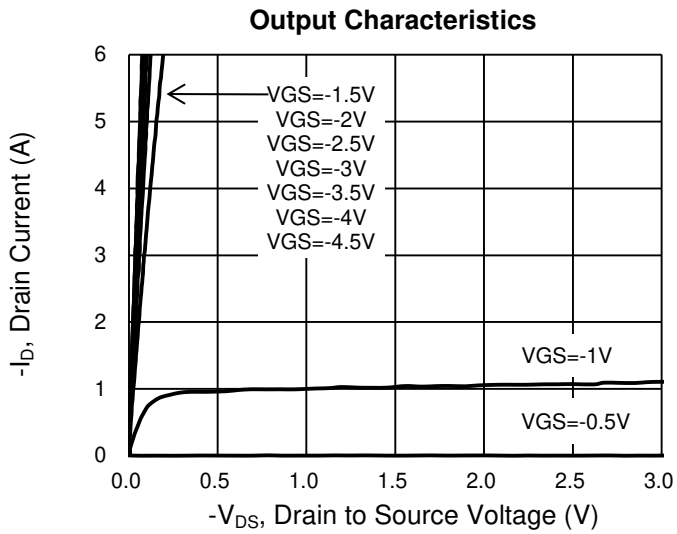
1. Package current limit.
2. Pulsed width limited by maximum junction temperature.
3. Pulse test: Pulse $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM160P02CS RLG	SOP-8	2.5Kpcs / 13" Reel

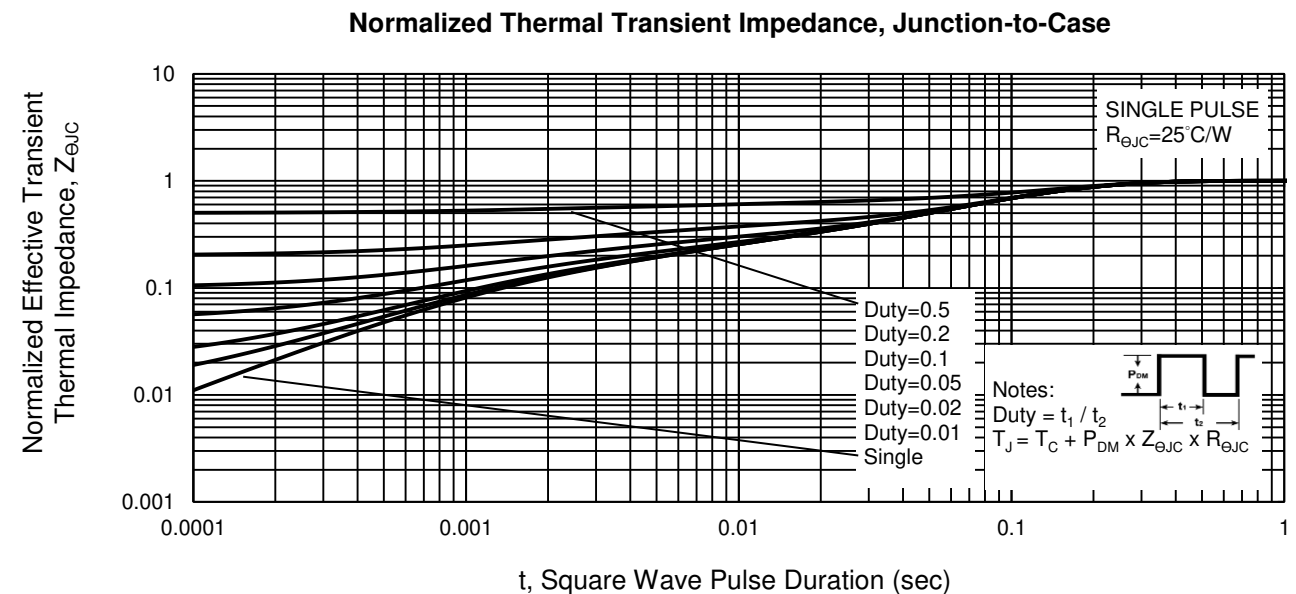
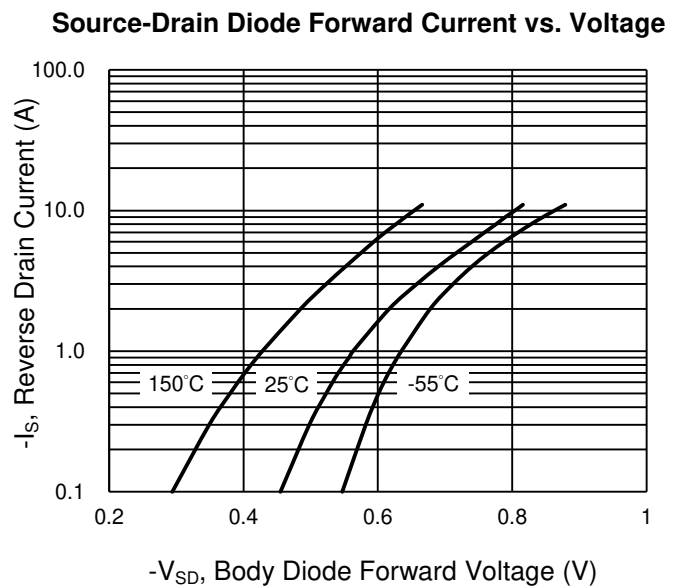
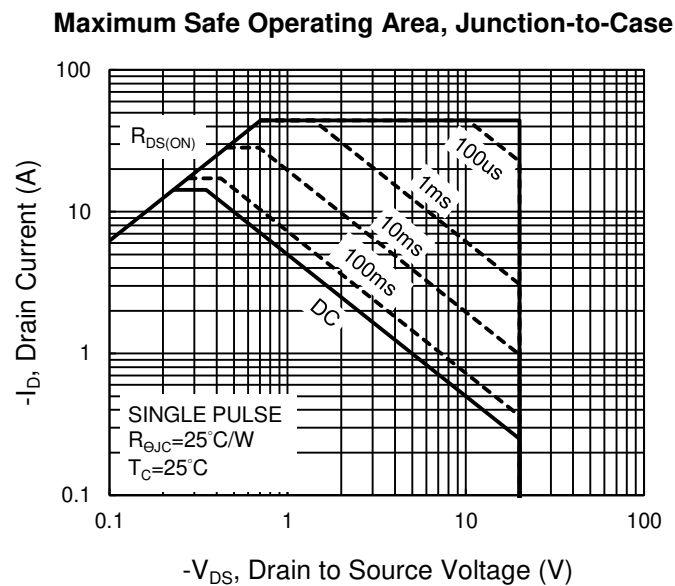
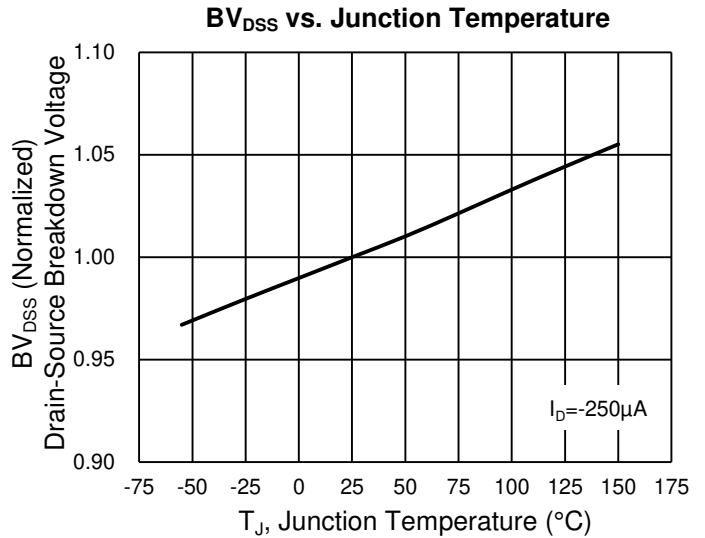
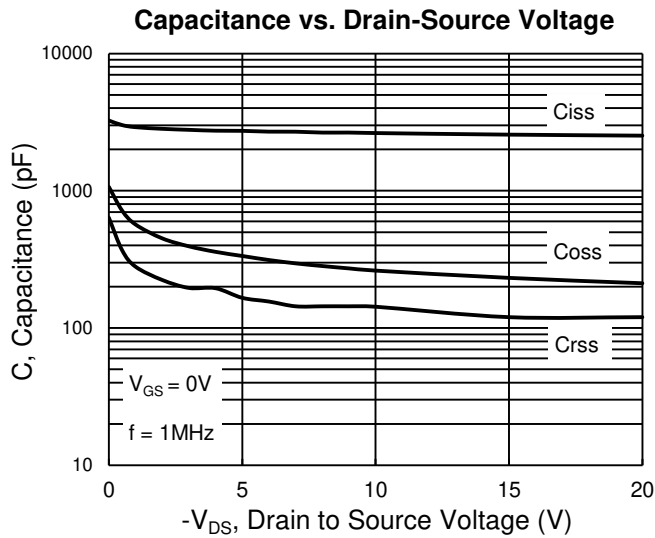
CHARACTERISTICS CURVES

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



CHARACTERISTICS CURVES

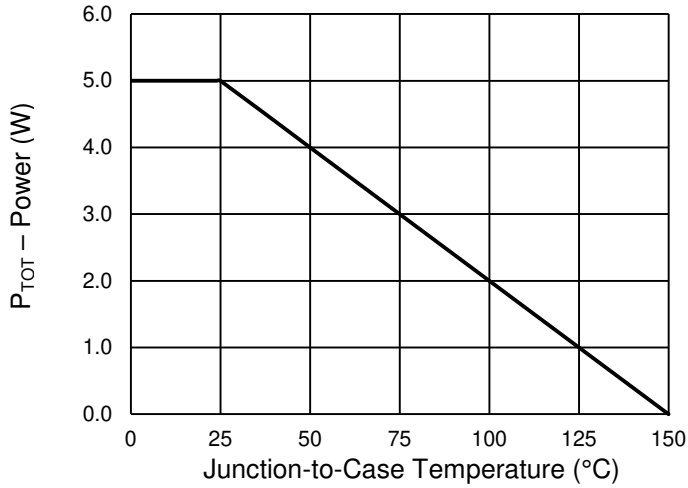
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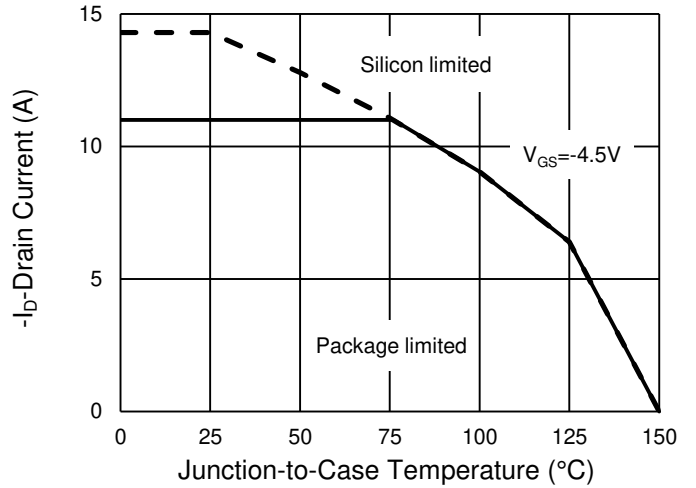
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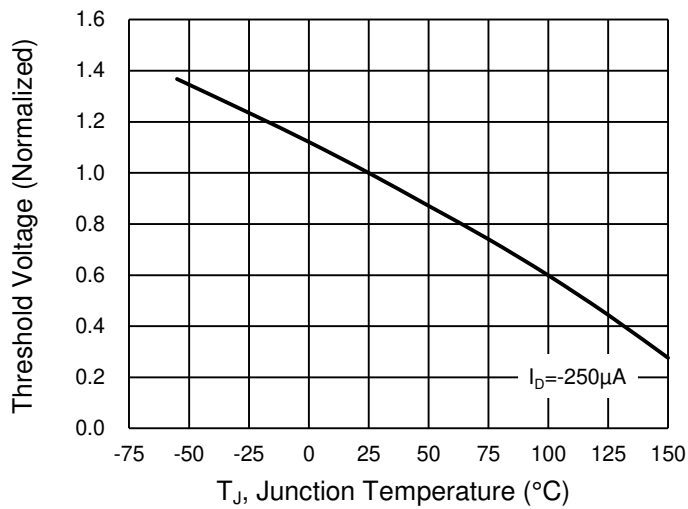
Power Dissipation



Drain Current

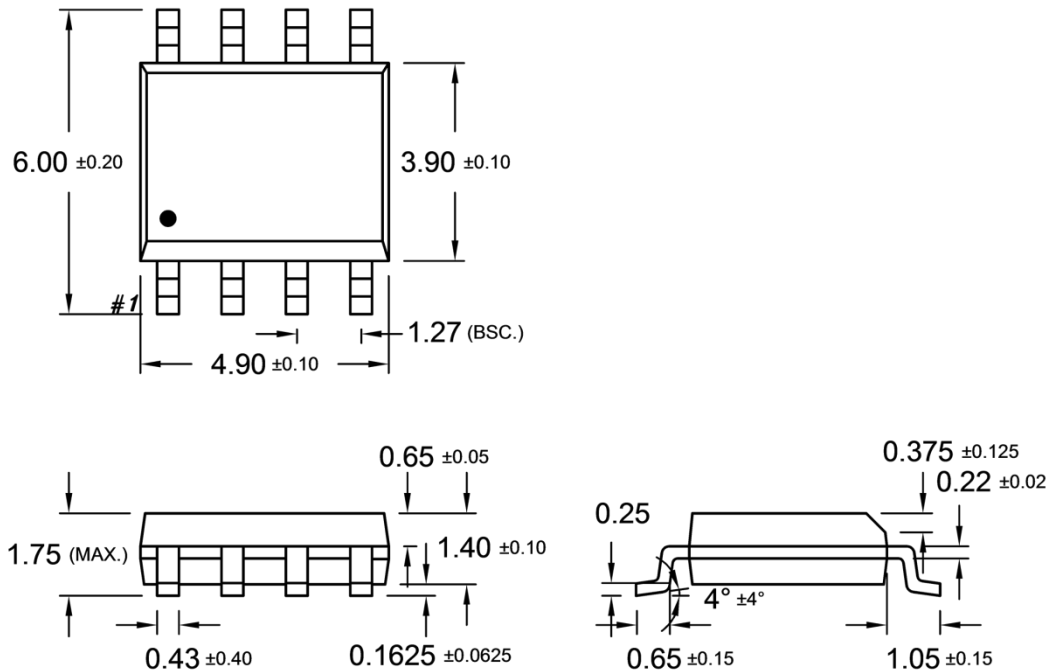


Normalized gate threshold voltage vs Temperature

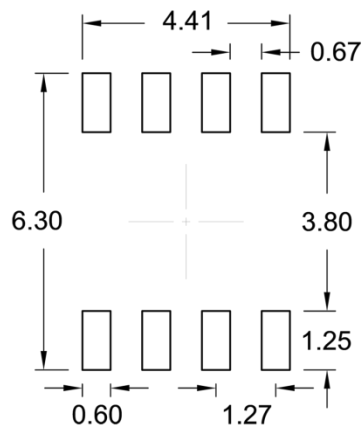


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

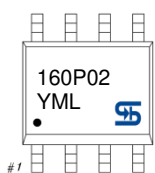
SOP-8



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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