

P-Channel Power MOSFET

-20V, -11A, 16mΩ

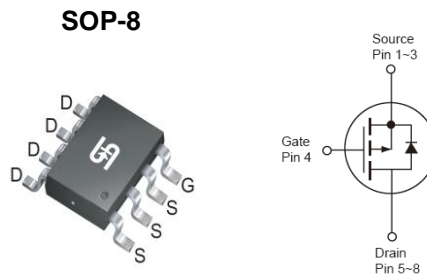
FEATURES

- Improved dV/dt capability
- Fast Switching
- Suitable for 1.8V drive applications
- Pb-free plating
- RoHS compliant
- Halogen-free mold compound

APPLICATION

- Load Switch
- Networking

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	-20	V
$R_{DS(on)}$ (max)	$V_{GS} = -4.5V$	16
	$V_{GS} = -2.5V$	22
	$V_{GS} = -1.8V$	28
Q_g	27	nC



Notes: Moisture sensitivity level: level 3. 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 ^(Note 1)	I_D	$T_C = 25^\circ C$	-11
		$T_C = 100^\circ C$	-7
Pulsed Drain Current ^(Note 2)	I_{DM}	-44	A
Total Power Dissipation @ $T_C = 25^\circ C$	P_{TOT}	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ C$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	25	$^\circ C/W$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	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 SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	$V_{GS(TH)}$	-0.3	-0.6	-1.0	V
Gate Body Leakage	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$	I_{DSS}	--	--	-1	μA
Drain-Source On-State Resistance	$V_{GS} = -4.5\text{V}, I_D = -6\text{A}$	$R_{DS(ON)}$	--	12	16	m Ω
	$V_{GS} = -2.5\text{V}, I_D = -4\text{A}$		--	16	22	
	$V_{GS} = -1.8\text{V}, I_D = -3\text{A}$		--	21	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	--	27	--	nC
Gate-Source Charge		Q_{gs}	--	2.4	--	
Gate-Drain Charge		Q_{gd}	--	5.3	--	
Input Capacitance	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	C_{iss}	--	2320	--	pF
Output Capacitance		C_{oss}	--	280	--	
Reverse Transfer Capacitance		C_{rss}	--	175	--	
Switching (Note 5)						
Turn-On Delay Time	$V_{DD} = -10\text{V},$ $R_{GEN} = 25\Omega,$ $I_D = -1\text{A}, V_{GS} = -4.5\text{V},$	$t_{d(on)}$	--	16.2	--	ns
Turn-On Rise Time		t_r	--	43.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	114	--	
Turn-Off Fall Time		t_f	--	28.8	--	
Source-Drain Diode (Note 3)						
Forward On Voltage	$I_S = -1\text{A}, V_{GS} = 0\text{V}$	V_{SD}	--	--	-1	V

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. Pulse test: $PW \leq 300\mu\text{s}$, 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

PART NO.	PACKAGE	PACKING
TSM160P02CS RLG	SOP-8	2,500pcs / 13"Reel

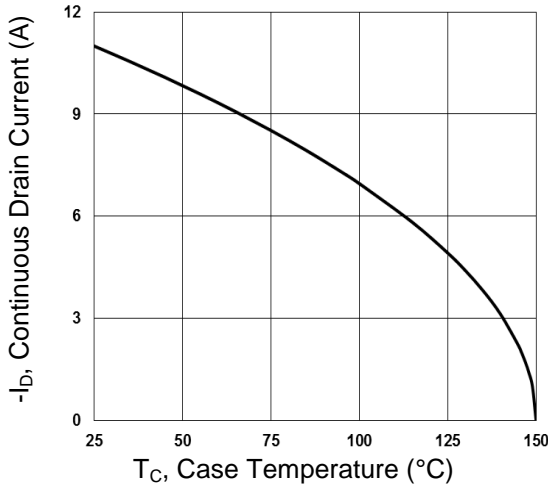
Note:

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

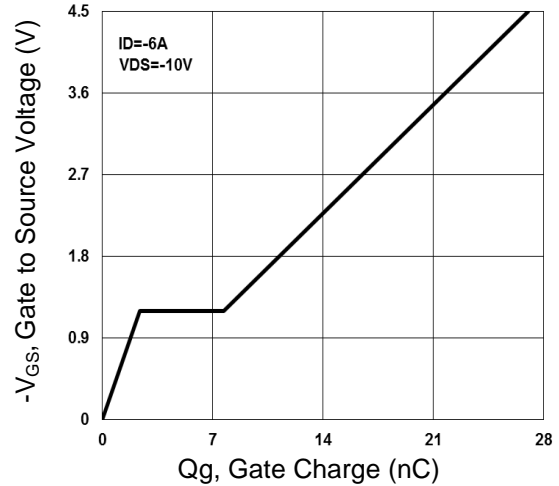
CHARACTERISTICS CURVES

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

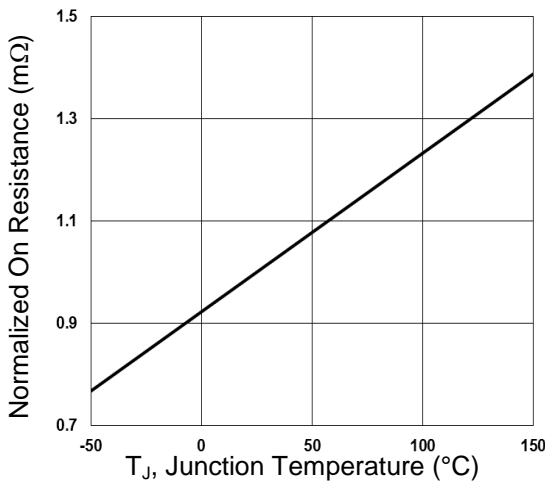
Continuous Drain Current vs. T_C



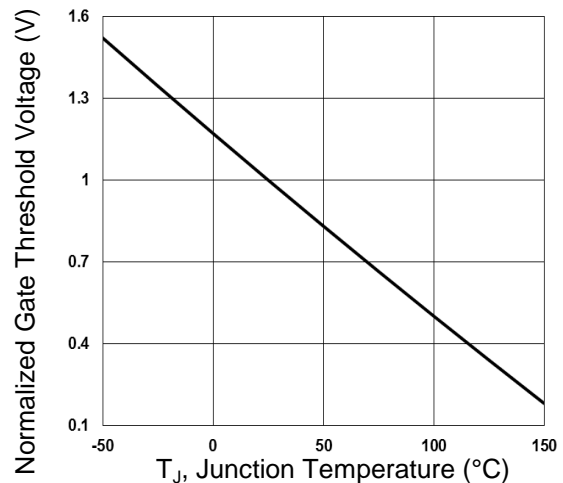
Gate Charge



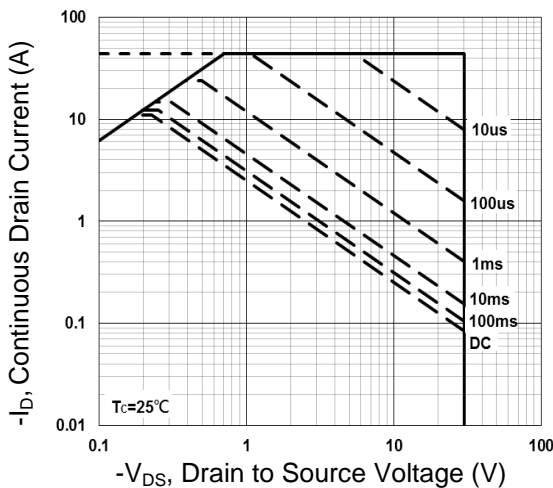
On-Resistance vs. Junction Temperature



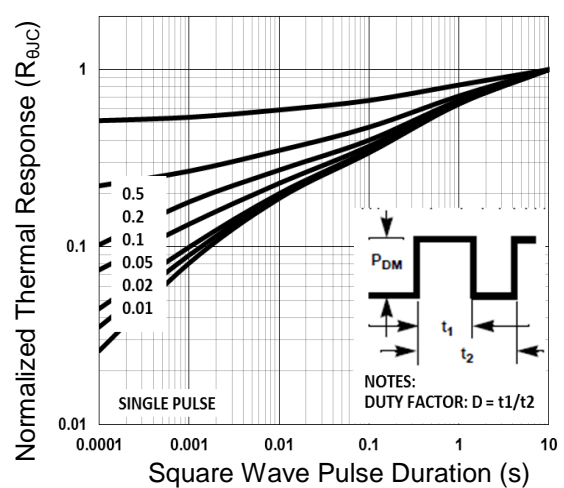
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area

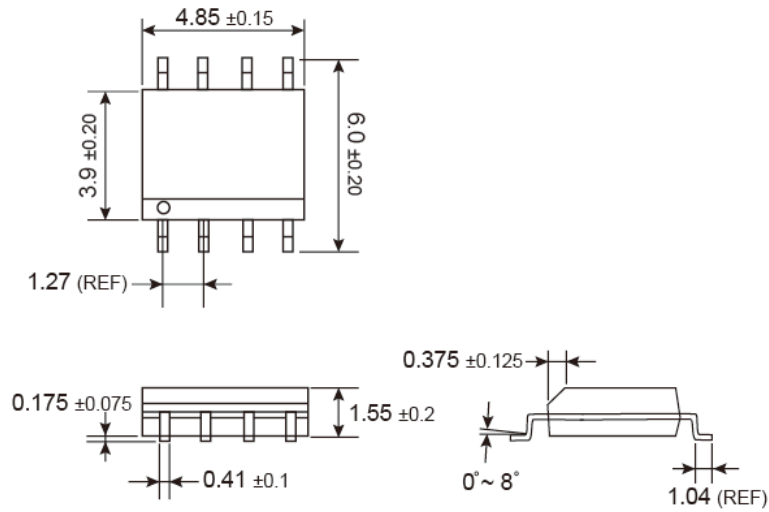


Normalized Thermal Transient Impedance Curve

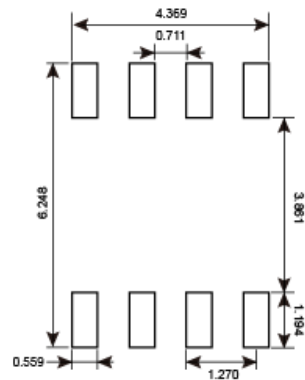


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

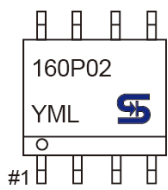
SOP-8



SUGGESTED PAD LAYOUT



MARKING DIAGRAM



- Y** = Year Code
- M** = Month Code for Halogen Free Product
 - 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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