

P-Channel Power MOSFET

-20V, -6.5A, 26mΩ

FEATURES

- Fast switching
- Suitable for -1.8V Gate Drive Applications
- Pb-free plating
- RoHS compliant
- Halogen-free mold compound

APPLICATION

- Battery Pack
- Portable Devices

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	-20	V
I_D	-6.5	A
$R_{DS(on)}$ (max)	$V_{GS} = -4.5V$	26
	$V_{GS} = -2.5V$	32
	$V_{GS} = -1.8V$	40
Q_g	19.5	nC



Note:

1. MSL 1 (Moisture Sensitivity Level) for SOT-26 per J-STD-020
2. MSL 3 (Moisture Sensitivity Level) for SOT-23 per J-STD-020

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ C$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 10	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	-6.5
		$T_C = 100^\circ C$	-4.1
Pulsed Drain Current ^(Note 1)	I_{DM}	-26	A
Total Power Dissipation	P_{DTOT}	1.56	W
Operating Junction Temperature	T_J	150	$^\circ C$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ C$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	80	$^\circ C/W$

Notes: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ is shown 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 2)						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	BV_{DSS}	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-0.3	-0.6	-1.0	V
Gate Body Leakage	$V_{GS} = \pm 10V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = -20V, V_{GS} = 0V$	I_{DSS}	--	--	-1	μA
	$V_{DS} = -16V, T_J = 125^\circ\text{C}$		--	--	-10	
Drain-Source On-State Resistance	$V_{GS} = -4.5V, I_D = -5A$	$R_{DS(on)}$	--	21	26	m Ω
	$V_{GS} = -2.5V, I_D = -4A$		--	26	32	
	$V_{GS} = -1.8V, I_D = -3A$		--	32	40	
Forward Transconductance	$V_{DS} = -10V, I_S = -5A$	g_{fs}	--	15	--	S
Dynamic (Note 3)						
Total Gate Charge	$V_{DS} = -10V, I_D = -5A,$ $V_{GS} = -4.5V$	Q_g	--	19.5	--	nC
Gate-Source Charge		Q_{gs}	--	2	--	
Gate-Drain Charge		Q_{gd}	--	3.6	--	
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V,$ $F = 1.0\text{MHz}$	C_{iss}	--	1670	--	pF
Output Capacitance		C_{oss}	--	220	--	
Reverse Transfer Capacitance		C_{rss}	--	120	--	
Switching						
Turn-On Delay Time	$V_{DD} = -10V, I_D = -1A,$ $V_{GS} = -4.5V,$ $R_{GEN} = 25\Omega$	$t_{d(on)}$	--	10.4	--	ns
Turn-On Rise Time		t_r	--	37.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	89.1	--	
Turn-Off Fall Time		t_f	--	24.6	--	
Source-Drain Diode						
Forward Voltage	$V_{GS} = 0V, I_S = -1A$	V_{SD}	--	--	-1	V
Continuous Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	-6.5	A
Pulse Forward Current		I_{SM}	--	--	-26	A

Notes:

1. Pulse width limited by safe operating area
2. Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
3. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM260P02CX RFG	SOT-23	3,000pcs / 7" Reel
TSM260P02CX6 RFG	SOT-26	3,000pcs / 7" Reel

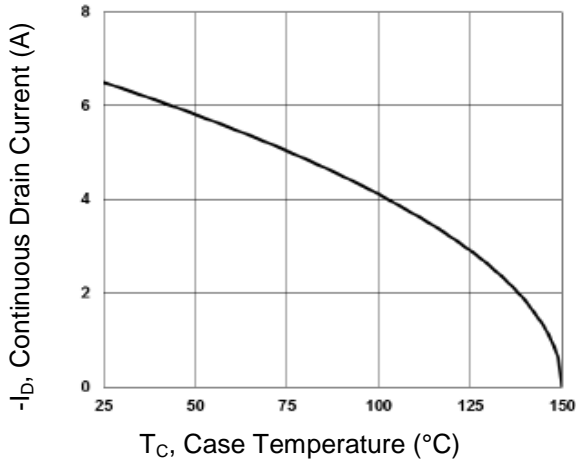
Note:

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

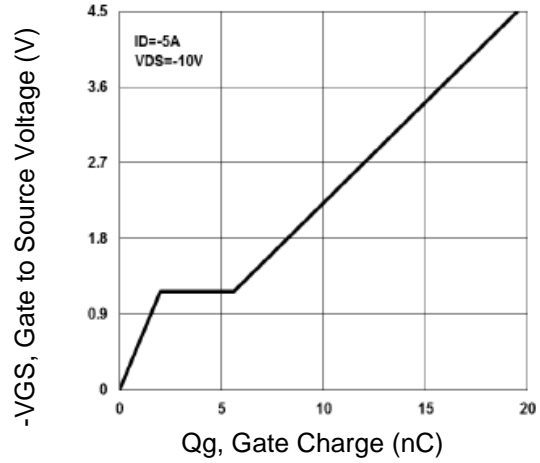
CHARACTERISTICS CURVES

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

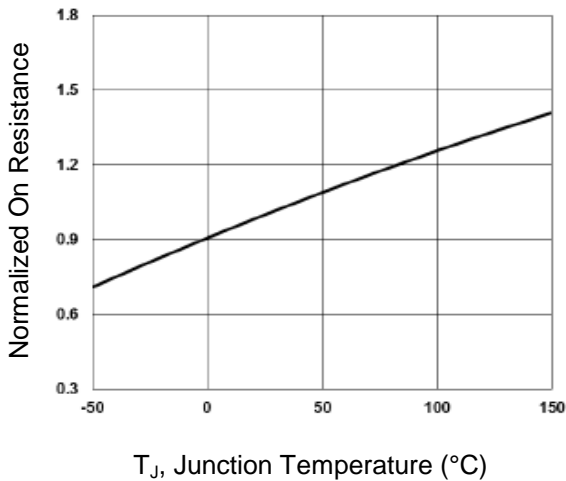
Continuous Drain Current vs. T_C



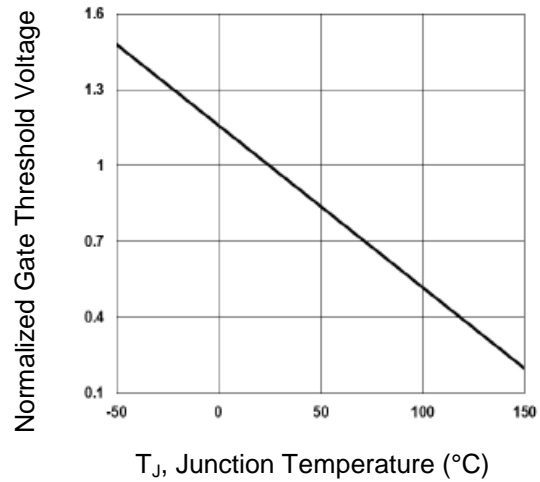
Gate Charge



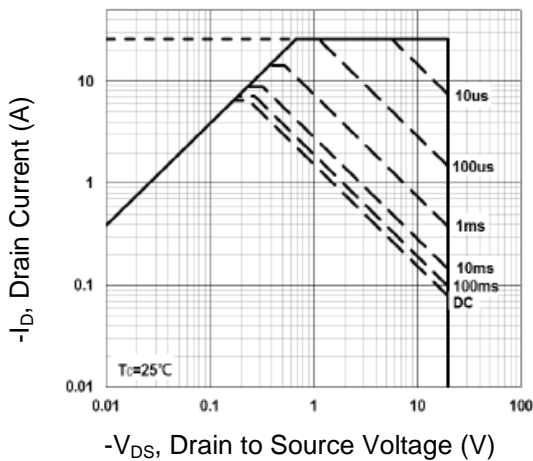
On-Resistance vs. Junction Temperature



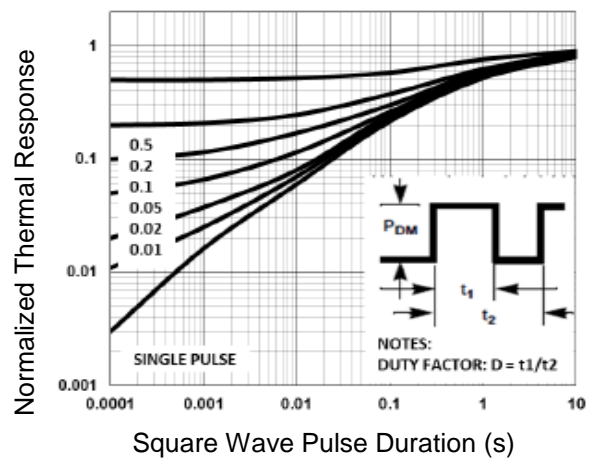
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area

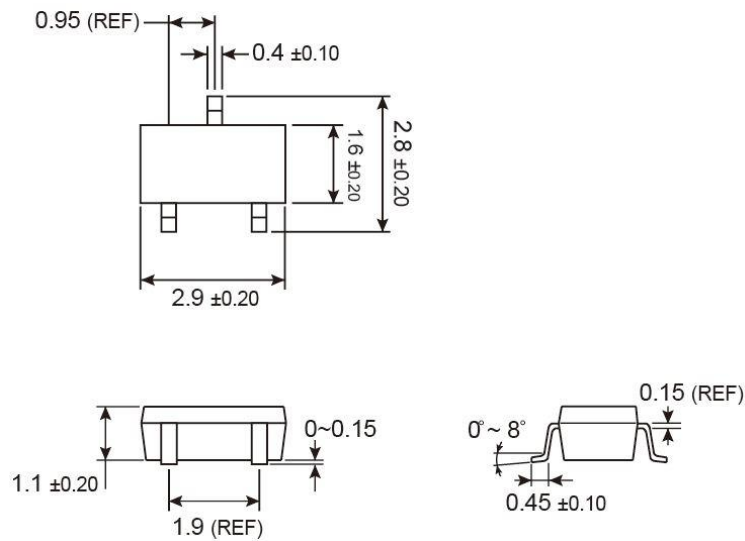


Normalized Thermal Transient Impedance Curve

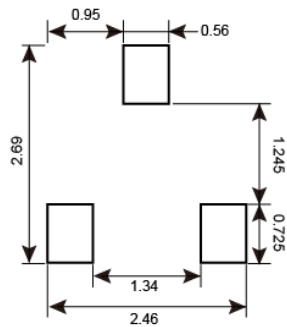


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

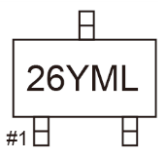
SOT-23



SUGGESTED PAD LAYOUT (Unit: Millimeters)



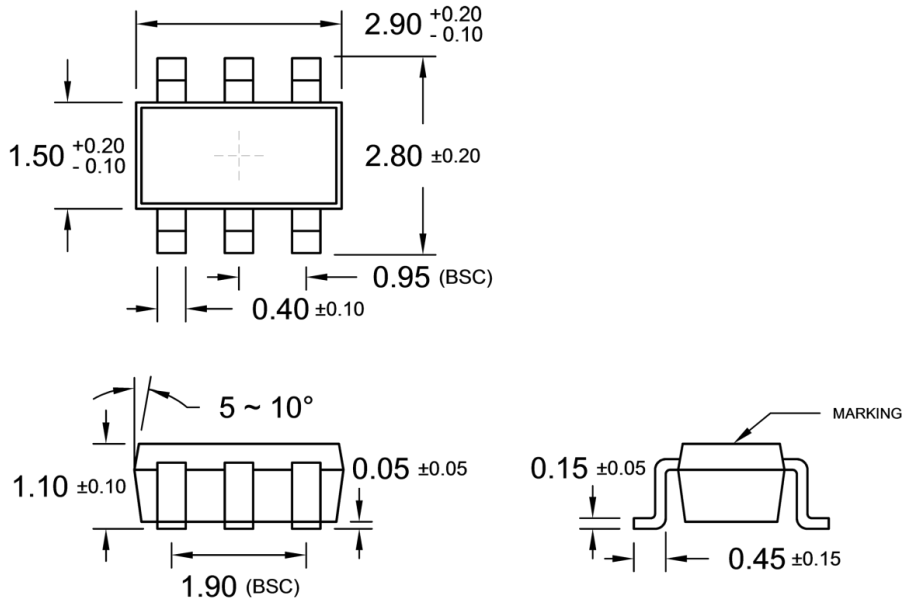
MARKING DIAGRAM



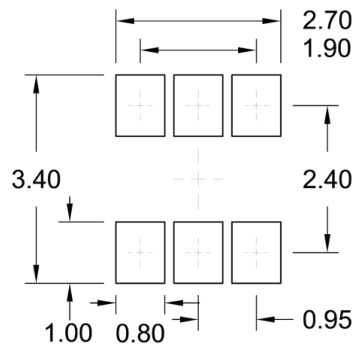
- 26** = Device Code
- Y** = Year Code
- M** = Month Code for Halogen Free Product
 - O** =Jan **P** =Feb **Q** =Mar **R** =Apr
 - S** =May **T** =Jun **U** =Jul **V** =Aug
 - W** =Sep **X** =Oct **Y** =Nov **Z** =Dec
- L** = Lot Code

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

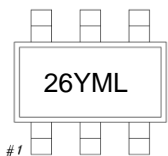
SOT-26



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



- 26** = Device Code
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