

N-Channel Power MOSFET

30V, 55A, 8mΩ

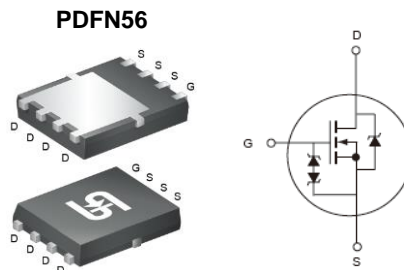
FEATURES

- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- G-S ESD Protection Diode Embedded

APPLICATION

- Vcore / MB
- POL Application
- SMPS 2nd SR

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	8
	$V_{GS} = 4.5V$	12.5
Q_g	7.5	nC



Notes: Moisture sensitivity level: level 3. 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}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^(Note 1)	I_D	$T_C = 25^\circ\text{C}$	55
		$T_C = 100^\circ\text{C}$	35
Pulsed Drain Current ^(Note 2)	I_{DM}	220	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{DTOT}	54	W
Single Pulsed Avalanche Energy ^(Note 3)	E_{AS}	45	mJ
Single Pulsed Avalanche Current ^(Note 3)	I_{AS}	30	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	2.3	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62	$^\circ\text{C/W}$

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 4)						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1	1.6	2.5	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 10	μA
Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 16A$	$R_{DS(on)}$	--	6.5	8	m Ω
	$V_{GS} = 4.5V, I_D = 8A$		--	9.5	12.5	m Ω
Dynamic (Note 5)						
Total Gate Charge	$V_{DS} = 15V, I_D = 20A,$ $V_{GS} = 4.5V$	Q_g	--	7.5	--	nC
Gate-Source Charge		Q_{gs}	--	1.3	--	
Gate-Drain Charge		Q_{gd}	--	4.5	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	750	--	pF
Output Capacitance		C_{oss}	--	150	--	
Reverse Transfer Capacitance		C_{rss}	--	110	--	
Gate Resistance	$F = 1MHz, \text{open drain}$	R_g	--	2.7	--	Ω
Switching (Note 6)						
Turn-On Delay Time	$V_{DD} = 15V,$ $R_{GEN} = 3.3\Omega,$ $I_D = 15A, V_{GS} = 10V,$	$t_{d(on)}$	--	4.8	--	ns
Turn-On Rise Time		t_r	--	12.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	27.6	--	
Turn-Off Fall Time		t_f	--	8.2	--	
Source-Drain Diode (Note 4)						
Forward On Voltage	$I_S = 1A, V_{GS} = 0V$	V_{SD}	--	--	1	V

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. $L = 0.1mH, I_{AS} = 30A, V_{DD} = 25V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
4. Pulse test: $PW \leq 300\mu s, \text{duty cycle} \leq 2\%$
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM080N03EPQ56 RLG	PDFN56	2,500pcs / 13" Reel

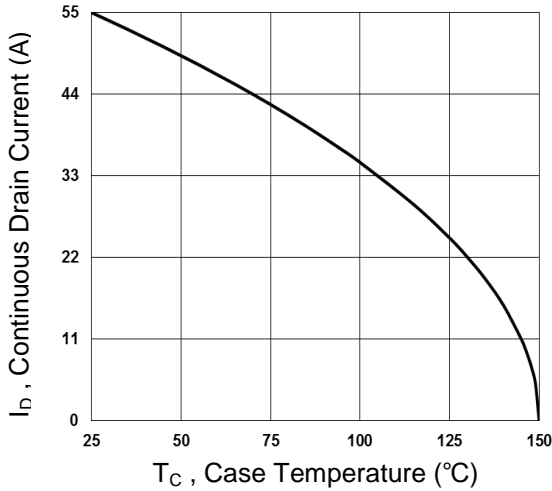
Note:

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

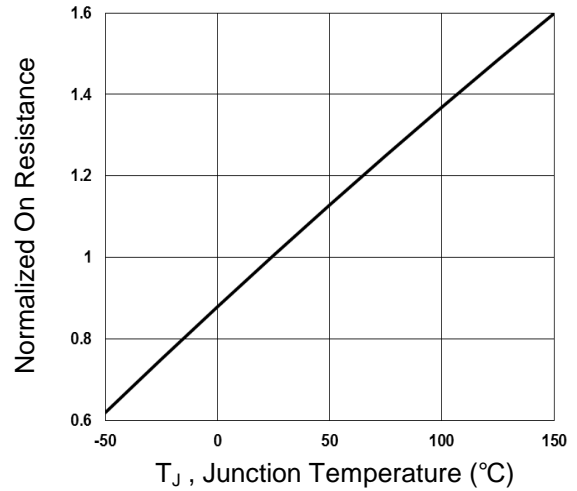
CHARACTERISTICS CURVES

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

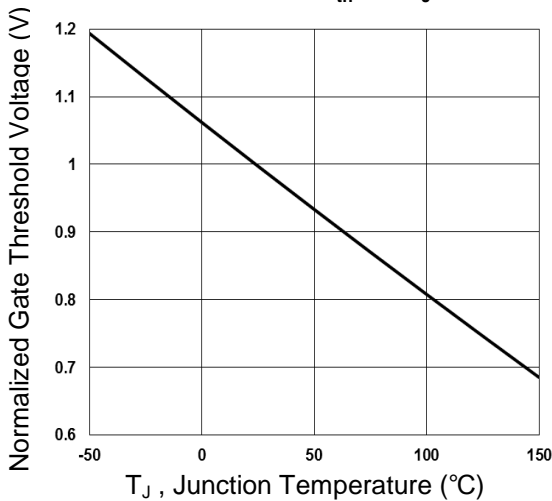
Continuous Drain Current vs. T_C



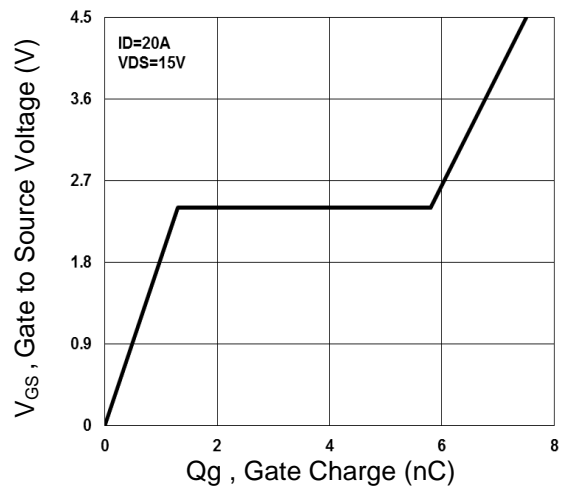
Normalized $R_{DS(on)}$ vs. T_J



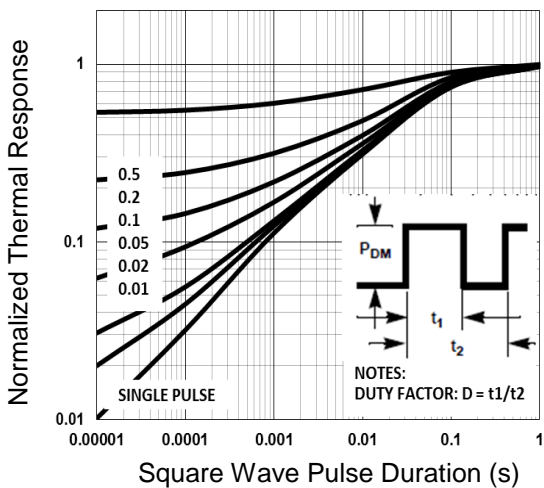
Normalized V_{th} vs. T_J



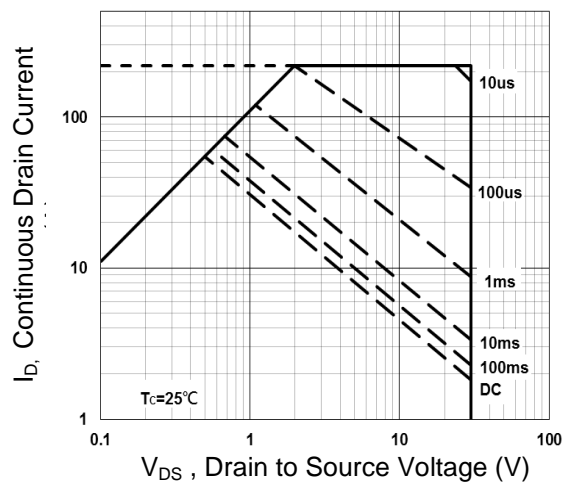
Gate Charge Waveform



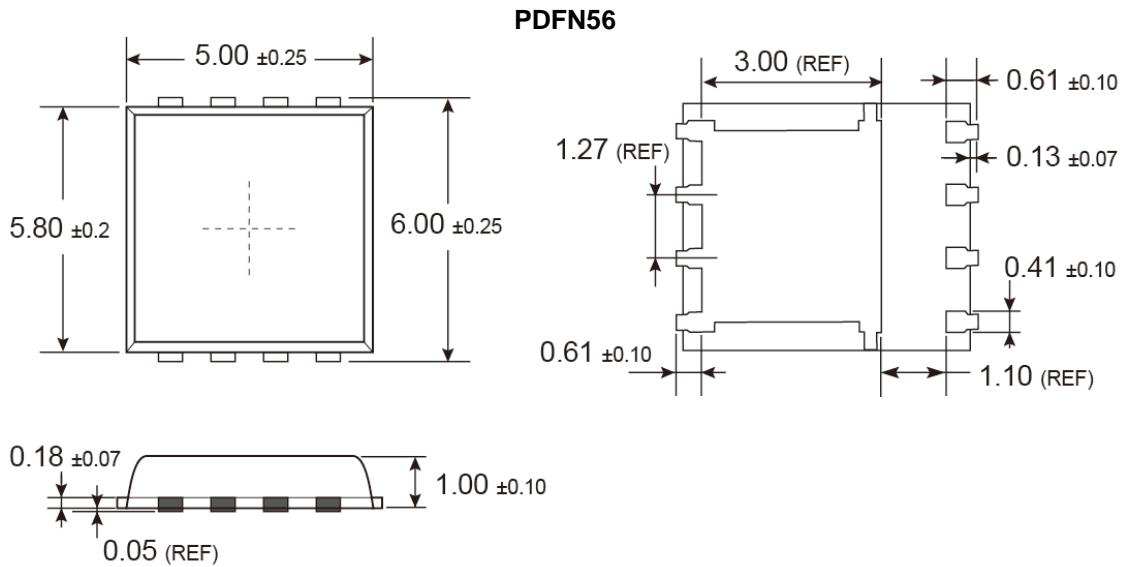
Normalized Transient Impedance



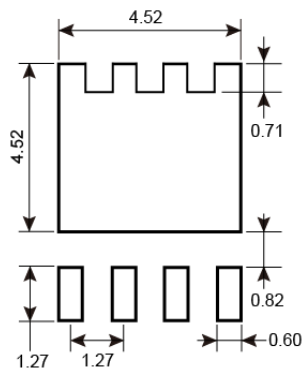
Maximum Safe Operation Area



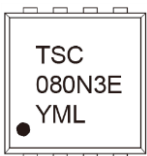
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



SUGGESTED PAD LAYOUT (Unit: Millimeters)



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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