

Dual P-Channel MOSFET

-60V, -12A, 68mΩ

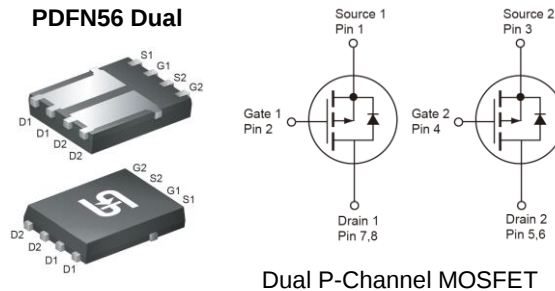
FEATURES

- Fast switching
- Low thermal resistance package
- Low profile package
- Pb-free plating
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

APPLICATION

- Power Supply
- Motor Control

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
V_{DS}	-60	V
$R_{DS(on)}$ (max)	$V_{GS} = -10V$	68
	$V_{GS} = -4.5V$	110
Q_g	16.4	nC



Dual P-Channel MOSFET

Note: MSL 1 (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	$T_C = 25^\circ\text{C}$	-12
		$T_C = 100^\circ\text{C}$	-8
Pulsed Drain Current (Note 2)	I_{DM}	-48	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{TOT}	3.5	W
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	7.2	mJ
Single Pulsed Avalanche Current (Note 3)	I_{AS}	12	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	$R_{\theta JC}$	4.5	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	85	$^\circ\text{C/W}$

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 = -250μA	BV _{DSS}	-60	--	--	V
Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	V _{GS(TH)}	-1.2	-1.6	-2.5	V
Gate Body Leakage	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V _{DS} = -60V, V _{GS} = 0V	I _{DSS}	--	--	-1	μA
	V _{DS} = -48V, T _c = 125°C		--	--	-10	
Drain-Source On-State Resistance	V _{GS} = -10V, I _D = -6A	R _{DS(on)}	--	54	68	mΩ
	V _{GS} = -4.5V, I _D = -3A		--	90	110	
Forward Transconductance	V _{DS} = -10V, I _D = -6A	g _{fs}	--	8.5	--	S
Dynamic ^(Note 5)						
Total Gate Charge	V _{DS} = -30V, I _D = -6A, V _{GS} = -10V	Q _g	--	16.4	--	nC
Gate-Source Charge		Q _{gs}	--	2.8	--	
Gate-Drain Charge		Q _{gd}	--	3.6	--	
Input Capacitance	V _{DS} = -30V, V _{GS} = 0V, f = 1.0MHz	C _{iss}	--	870	--	pF
Output Capacitance		C _{oss}	--	70	--	
Reverse Transfer Capacitance		C _{rss}	--	42	--	
Switching ^(Note 6)						
Turn-On Delay Time	V _{DD} = -30V, I _D = -1A, R _{GEN} =6Ω	t _{d(on)}	--	8.3	--	ns
Turn-On Rise Time		t _r	--	42.4	--	
Turn-Off Delay Time		t _{d(off)}	--	64.6	--	
Turn-Off Fall Time		t _f	--	16.4	--	
Source-Drain Diode ^(Note 4)						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I _S	--	--	-12	A
Maximum Pulse Drain-Source Diode Forward Current		I _{SM}	--	--	-48	A
Diode-Source Forward Voltage	V _{GS} = 0V, I _S = -1A	V _{SD}	--	--	-1	V

Notes:

- Current limited by package
- Pulse width limited by the maximum junction temperature
- $L = 0.1\text{mH}, I_{AS} = -12A, V_{DD} = -25V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Switching time is essentially independent of operating temperature.

ORDERING INFORMATION (EXAMPLE)

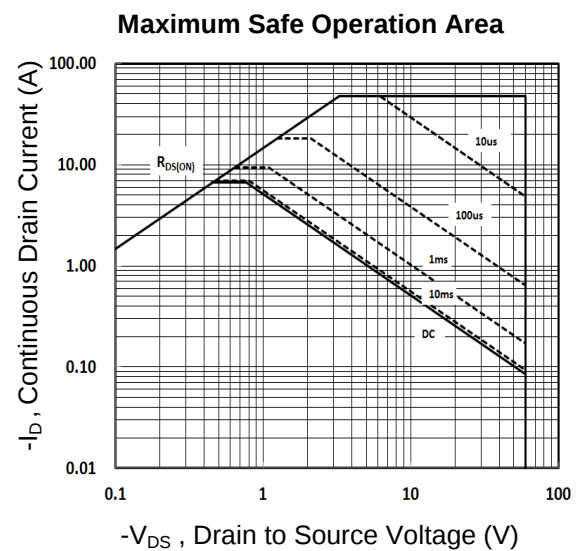
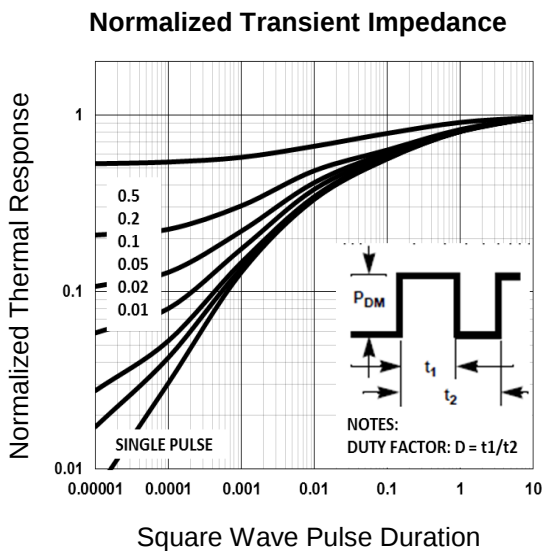
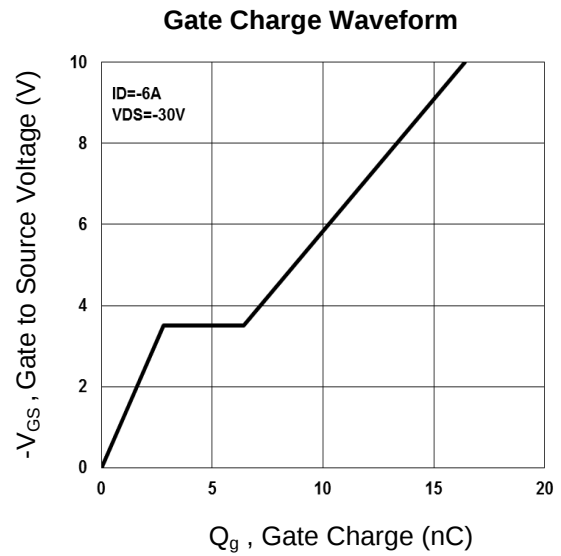
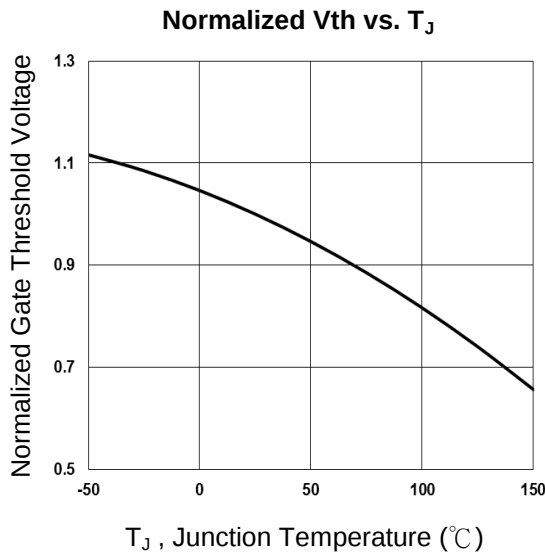
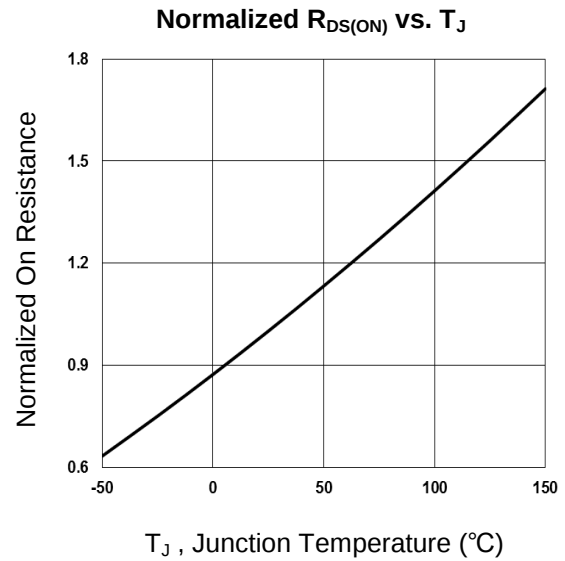
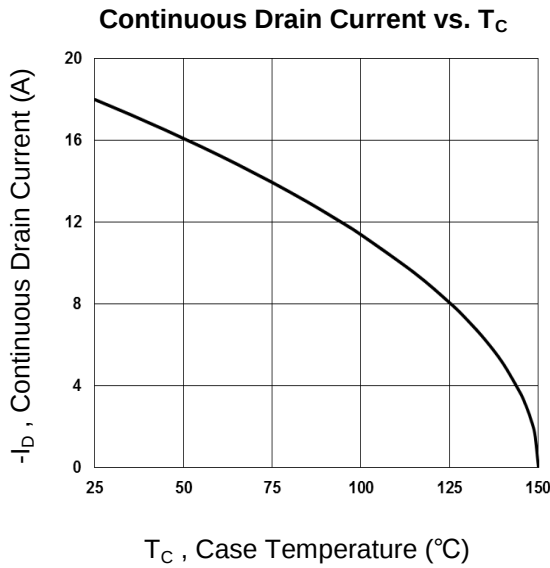
PART NO.	PACKAGE	PACKING
TSM680P06DPQ56 RLG	PDFN56 Dual	2,500pcs / 13"Reel

Note:

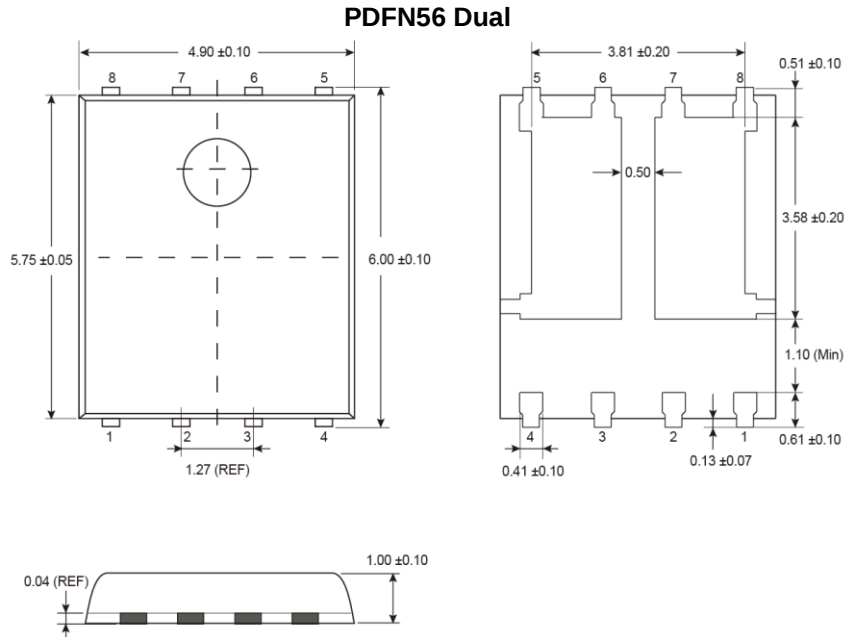
1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

CHARACTERISTICS CURVES

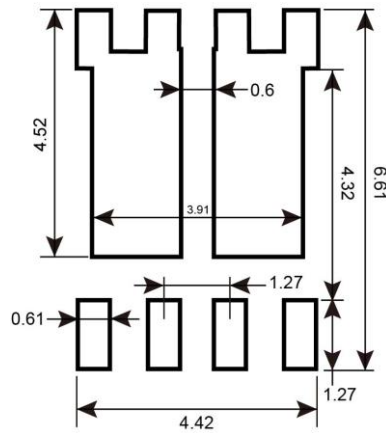
($T_C = 25^\circ\text{C}$ unless otherwise noted)



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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