Dual N-Channel Power MOSFET

20V, 5.8A, 25mΩ

Features

- Halogen-Free according to IEC 61249-2-21
- Suited for 1.8V drive applications
- Low profile package
- RoHS Compliant

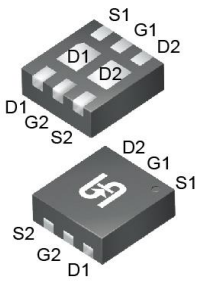
APPLICATION

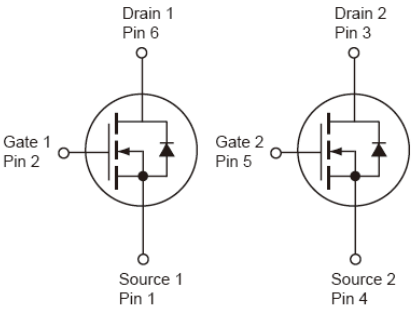
- Battery Pack
- Load Switch

KEY PERFORMANCE PARAMETERS			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		20	V
$R_{DS(on)}$ (max)	V_{GS} = 4.5V	25	mΩ
	V_{GS} = 2.5V	35	
	V_{GS} = 1.8V	55	
Q_g		7.7	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

TDFN 2x2





Notes: Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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)	T_C = 25°C	I_D	5.8	A
	T_C = 100°C		3.48	
Pulsed Drain Current (Note 2)		I_{DM}	23.2	A
Total Power Dissipation @ T_C = 25°C		P_{DTOT}	0.62	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	200	°C/W

Notes: $R_{\Theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. $R_{\Theta JA}$ 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.

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ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static (Note 3)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	0.4	0.6	0.8	V
Gate Body Leakage	V_{GS} = ±10V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance	V_{GS} = 4.5V, I_D = 4A	$R_{DS(on)}$	--	20	25	mΩ
	V_{GS} = 2.5V, I_D = 3A		--	27	35	
	V_{GS} = 1.8V, I_D = 2A		--	39	55	
Forward Transconductance	V_{DS}=10V, I_D=3A	g_{fs}	--	6.5	--	S
Dynamic (Note 4)						
Total Gate Charge	V_{DS} = 10V, I_D = 4A, V_{GS} = 4.5V	Q_g	--	7.7	11	nC
Gate-Source Charge		Q_{gs}	--	0.9	1	
Gate-Drain Charge		Q_{gd}	--	2.4	5	
Input Capacitance	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	535	775	pF
Output Capacitance		C_{oss}	--	60	85	
Reverse Transfer Capacitance		C_{rss}	--	34	50	
Switching (Note 5)						
Turn-On Delay Time	V_{DD} = 10V, I_D = 1A, V_{GS} = 4.5V, R_G = 25Ω	$t_{d(on)}$	--	4.1	8	ns
Turn-On Rise Time		t_r	--	11.6	22	
Turn-Off Delay Time		$t_{d(off)}$	--	23.9	45	
Turn-Off Fall Time		t_f	--	7.6	14	
Source-Drain Diode (Note 3)						
Continuous Source Current		I_S	--	--	5.8	A
ulsed Source Current		I_{SM}	--	--	23.2	A
Forward On Voltage	V_{GS} = 0V, I_S = 1A	V_{SD}	--	--	1	V

Notes:

1. Current limited by package.
2. Pulse width limited by the maximum junction temperature.
3. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%.
4. For DESIGN AID ONLY, not subject to production testing.
5. Switching time is essentially independent of operating temperature.

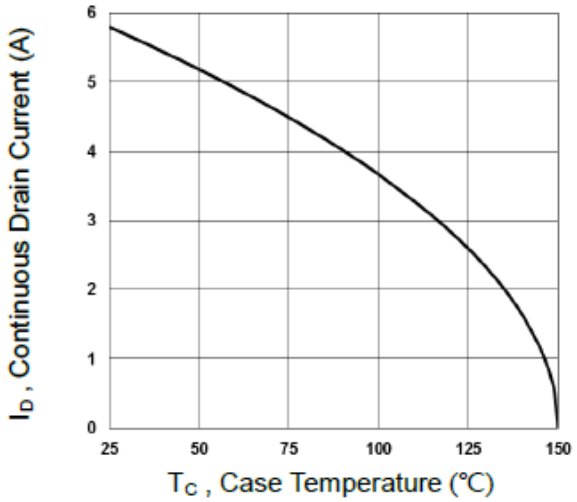
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM250N02DCQ RFG	TDFN 2x2	3,000pcs / 7” Reel

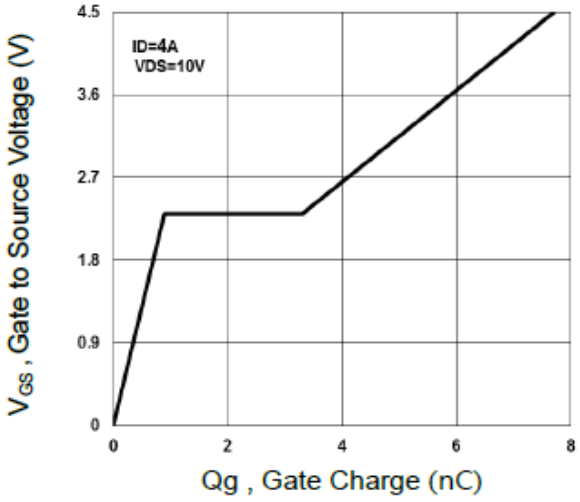
CHARACTERISTICS CURVES

(T_C = 25°C unless otherwise noted)

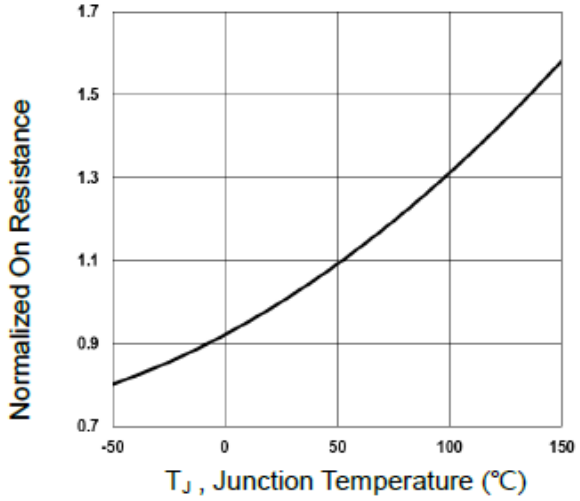
Continuous Drain Current vs. T_C



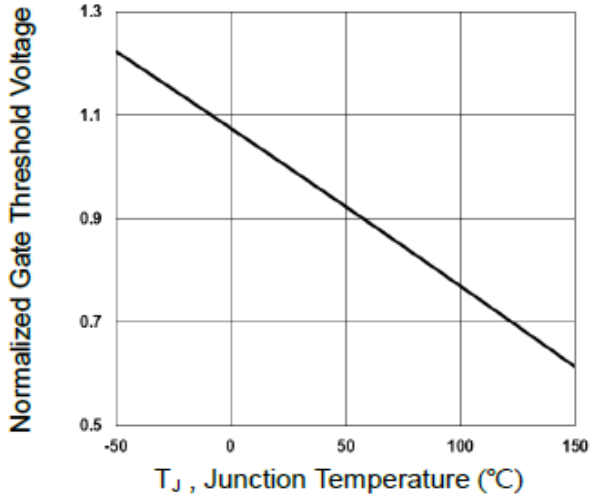
Gate Charge



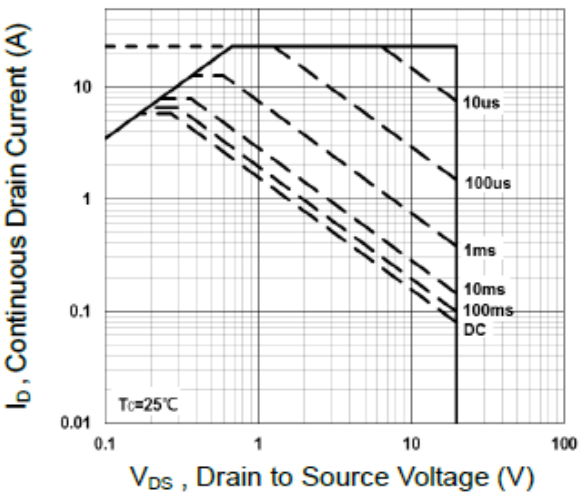
On-Resistance vs. Junction Temperature



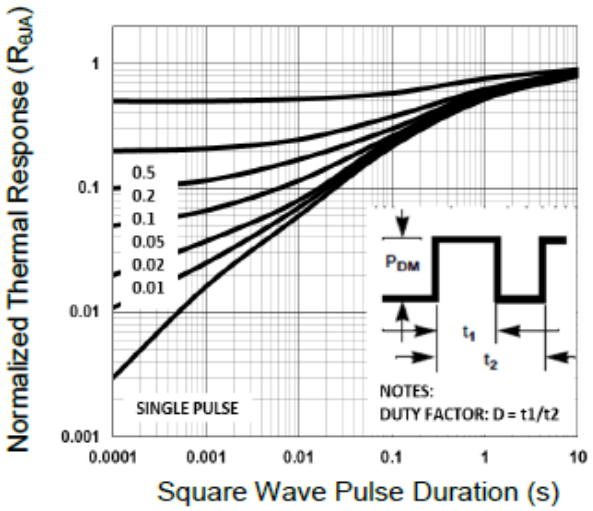
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area

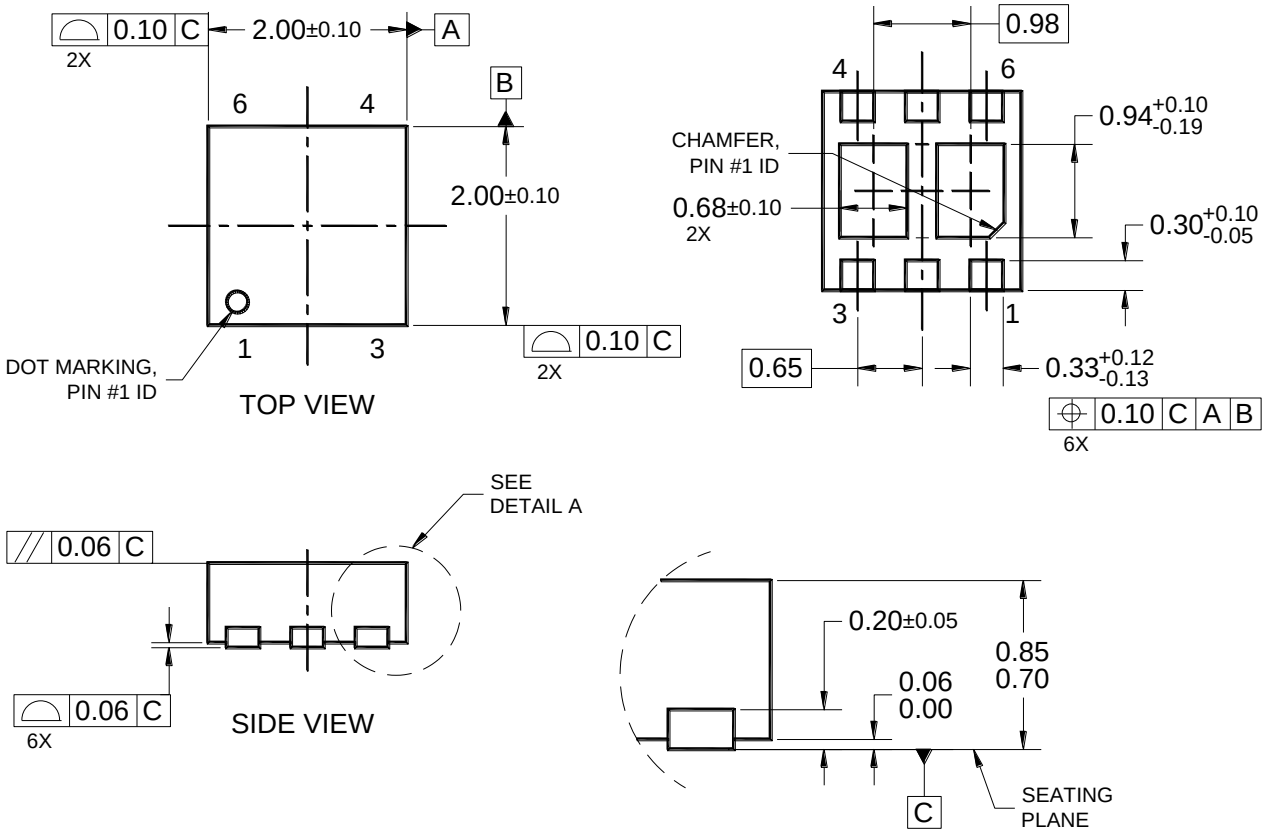


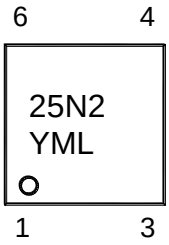
Normalized Thermal Transient Impedance Curve



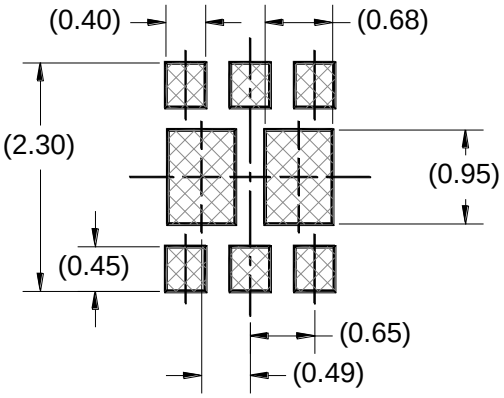
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TDFN2x2





MARKING DIAGRAM
(TOP VIEW)



SUGGESTED PAD LAYOUT

P/N = 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 (1~9, A~Z)

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. SEATING PLANE IS DEFINED BY TERMINAL BOTTOM SURFACE ONLY.
4. DWG NO. REF: HQ2SD07-TDFN2X2D-003 REV A

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