

## Dual N-Channel MOSFET

30V, 20A, 20mΩ

### FEATURES

- Fast switching
- 100% avalanche tested
- 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

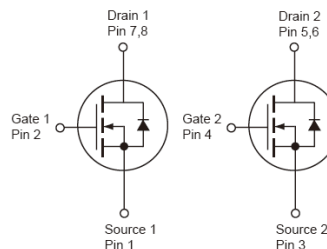
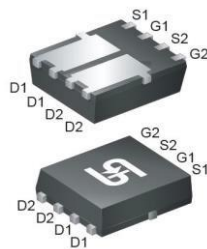
### APPLICATIONS

- Power Supply
- Motor Control

KEY PERFORMANCE PARAMETERS			
PARAMETER		VALUE	UNIT
$V_{DS}$		30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	20	mΩ
	$V_{GS} = 4.5V$	30	
$Q_g$		4.1	nC



PDFN33 Dual



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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	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>(Note 1)</sup>	$I_D$	$T_C = 25^\circ\text{C}$	20
		$T_C = 100^\circ\text{C}$	13
Pulsed Drain Current <sup>(Note 2)</sup>	$I_{DM}$	80	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_{DTOT}$	20	W
Single Pulsed Avalanche Energy <sup>(Note 3)</sup>	$E_{AS}$	14	mJ
Single Pulsed Avalanche Current <sup>(Note 3)</sup>	$I_{AS}$	17	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	$R_{\theta JC}$	6.4	$^\circ\text{C/W}$
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

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b> (Note 4)						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	$BV_{DSS}$	30	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	1.2	1.5	2.5	V
Gate Body Leakage	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	--	--	1	$\mu\text{A}$
	$V_{DS} = 24\text{V}, T_C = 125^\circ\text{C}$		--	--	10	
Drain-Source On-State Resistance	$V_{GS} = 10\text{V}, I_D = 10\text{A}$	$R_{DS(on)}$	--	17	20	m $\Omega$
	$V_{GS} = 4.5\text{V}, I_D = 6\text{A}$		--	23	30	
Forward Transconductance	$V_{DS} = 5\text{V}, I_D = 6\text{A}$	$g_{fs}$	--	13	--	S
<b>Dynamic</b> (Note 5)						
Total Gate Charge	$V_{DS} = 15\text{V}, I_D = 8\text{A},$ $V_{GS} = 4.5\text{V}$	$Q_g$	--	4.1	--	nC
Gate-Source Charge		$Q_{gs}$	--	1	--	
Gate-Drain Charge		$Q_{gd}$	--	2.1	--	
Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	$C_{iss}$	--	345	--	pF
Output Capacitance		$C_{oss}$	--	55	--	
Reverse Transfer Capacitance		$C_{rss}$	--	32	--	
<b>Switching</b> (Note 6)						
Turn-On Delay Time	$V_{DD} = 15\text{V}, I_D = 1\text{A},$ $R_{GEN} = 6\Omega$	$t_{d(on)}$	--	2.8	--	ns
Turn-On Rise Time		$t_r$	--	7.2	--	
Turn-Off Delay Time		$t_{d(off)}$	--	15.8	--	
Turn-Off Fall Time		$t_f$	--	4.6	--	
<b>Source-Drain Diode</b> (Note 4)						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	$I_S$	--	--	20	A
Maximum Pulse Drain-Source Diode Forward Current		$I_{SM}$	--	--	80	A
Diode-Source Forward Voltage	$V_{GS} = 0\text{V}, I_S = 1\text{A}$	$V_{SD}$	--	--	1	V

**Notes:**

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3.  $L = 0.1\text{mH}, I_{AS} = 17\text{A}, V_{DD} = 25\text{V}, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse test:  $PW \leq 300\mu\text{s}$ , 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**

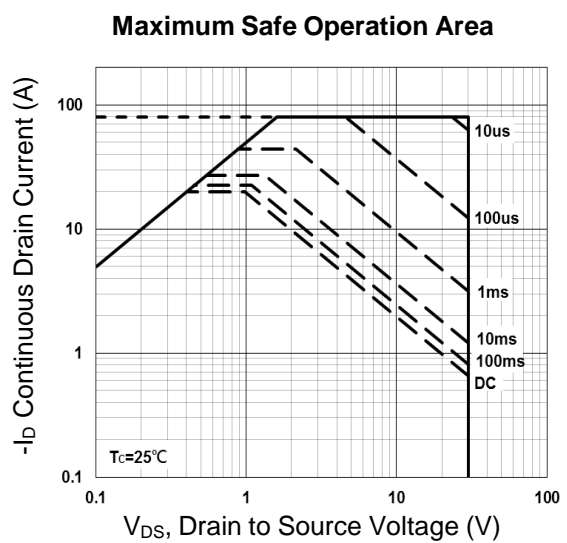
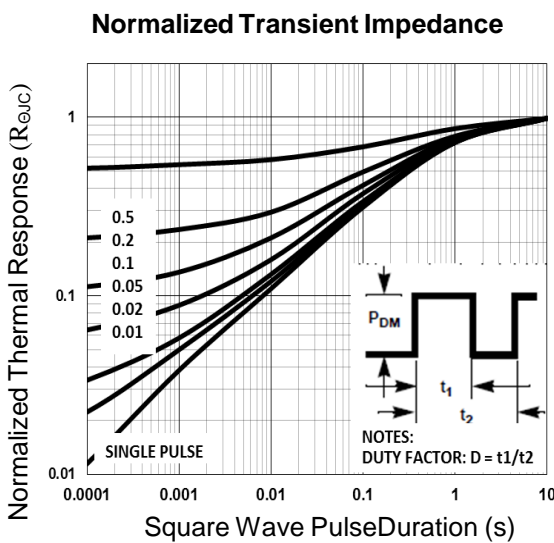
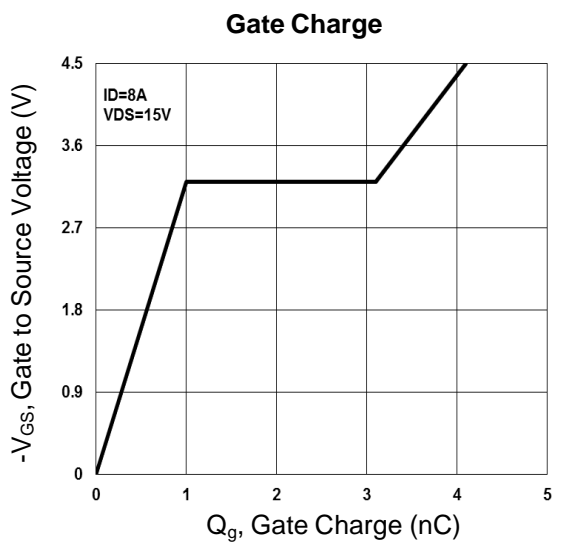
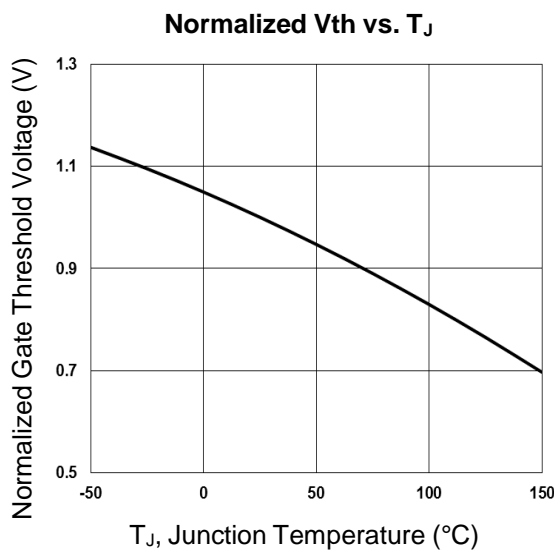
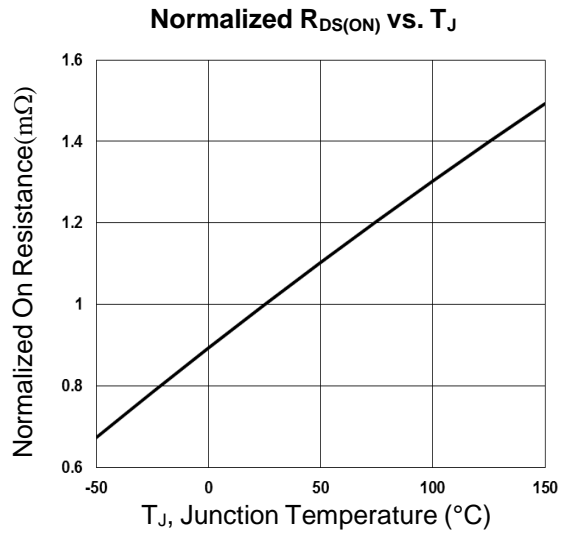
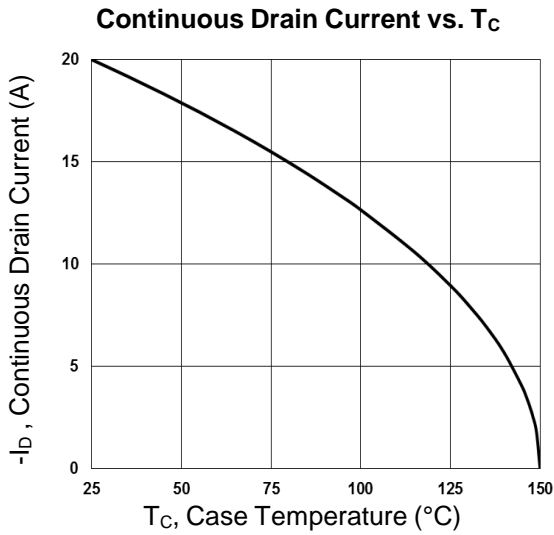
<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM200N03DPQ33 RGG	PDFN33 Dual	5Kpcs / 13"Reel

**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

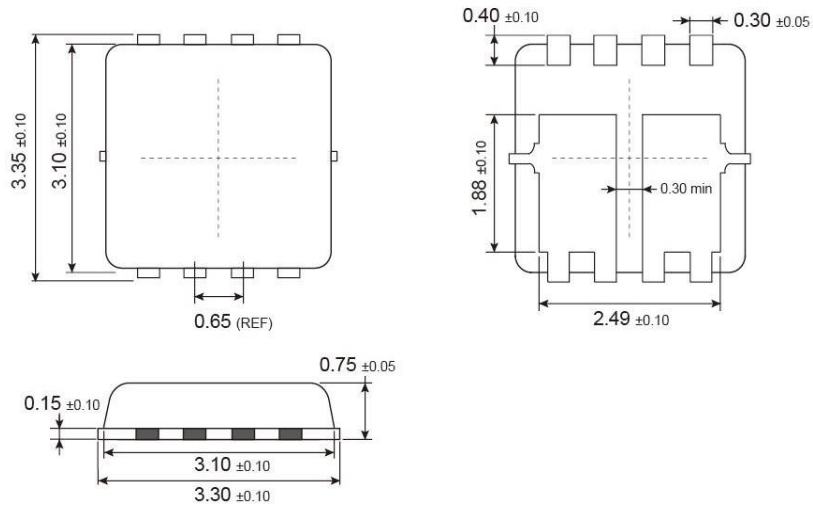
**CHARACTERISTICS CURVES**

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

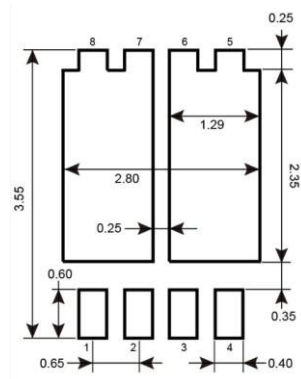


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

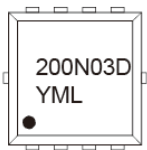
**PDFN33 Dual**



**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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