

P-Channel Power MOSFET

-30V, -36A, 15mΩ

FEATURES

- Low $R_{DS(on)}$ to minimize conductive Loss
- Low gate charge for fast power switching
- 100% UIS tested
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

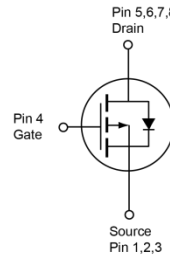
APPLICATIONS

- DC-DC Converters
- Battery Power Management
- Oring FET/Load Switch

PRODUCT SUMMARY			
PARAMETER		VALUE	UNIT
V_{DS}		-30	V
$R_{DS(on)}$ (max)	$V_{GS} = -10V$	15	mΩ
	$V_{GS} = -4.5V$	30	
Q_g		14.3	nC



PDFN33



Notes: MSL 3 (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}	± 20	V
Continuous Drain Current (Note 1)	$T_C = 25^\circ\text{C}$	I_D	-36	A
	$T_A = 25^\circ\text{C}$		-10	
Pulsed Drain Current (Note 1)		I_{DM}	-144	A
Single Pulse Avalanche Current (Note 2)		I_{AS}	-31	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	48	mJ
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	27.8	W
	$T_C = 125^\circ\text{C}$		5.5	
Total Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	2.3	W
	$T_A = 125^\circ\text{C}$		0.5	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL RESISTANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	4.5	$^\circ\text{C/W}$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	53	$^\circ\text{C/W}$

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.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ 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}	-30	--	--	V
Gate Threshold Voltage	V _{GS} = V _{DS} , I _D = -250μA	V _{GS(TH)}	-1.2	-1.6	-2.5	V
Gate-Source Leakage Current	V _{GS} = ±20V, V _{DS} = 0V	I _{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V _{GS} = 0V, V _{DS} = -30V	I _{DSS}	--	--	-1	μA
Drain-Source On-State Resistance	V _{GS} = -10V, I _D = -10A	R _{DS(on)}	--	13	15	mΩ
	V _{GS} = -4.5V, I _D = -10A		--	22	30	
Forward Transconductance	V _{DS} = -5V, I _D = -10A	g _{fs}	--	19	--	S
Dynamic ^(Note 4)						
Total Gate Charge	V _{GS} = -10V, V _{DS} = -15V, I _D = -10A	Q _g	--	29.3	--	nC
Total Gate Charge	V _{GS} = -4.5V, V _{DS} = -15V, I _D = -10A	Q _g		14.3		
Gate-Source Charge		Q _{gs}	--	5.9	--	
Gate-Drain Charge		Q _{gd}	--	5.2	--	
Input Capacitance	V _{GS} = 0V, V _{DS} = -15V, f = 1.0MHz	C _{iss}	--	1829	--	pF
Output Capacitance		C _{oss}	--	227	--	
Reverse Transfer Capacitance		C _{rss}	--	160	--	
Switching ^(Note 4)						
Turn-On Delay Time	V _{GS} = -10V, V _{DS} = -15V, I _D = -1A, R _G = 6Ω,	t _{d(on)}	--	9	--	ns
Rise Time		t _r	--	21.8	--	
Turn-Off Delay Time		t _{d(off)}	--	59.8	--	
Fall Time		t _f	--	14.4	--	
Source-Drain Diode ^(Note 3)						
Diode Forward Voltage	V _{GS} = 0V, I _S = -10A	V _{SD}	--	--	-1	V
Reverse Recovery Time	I _S = -10A, di/dt = 100A/μs	t _{rr}	--	34	--	ns
Reverse Recovery Charge		Q _{rr}	--	23	--	nC

Notes:

- Current limited by package.
- $L = 0.1\text{mH}$, $V_{GS} = -10V$, $V_{DS} = -25V$, $R_G = 25\Omega$, $I_{AS} = -31A$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

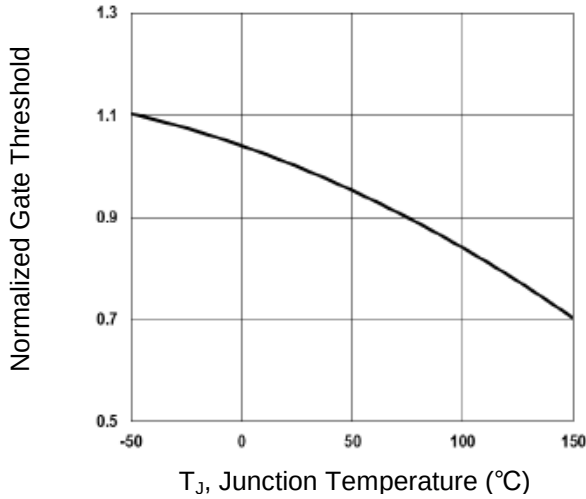
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM150P03PQ33 RGG	PDFN33	5,000pcs / 13" Reel

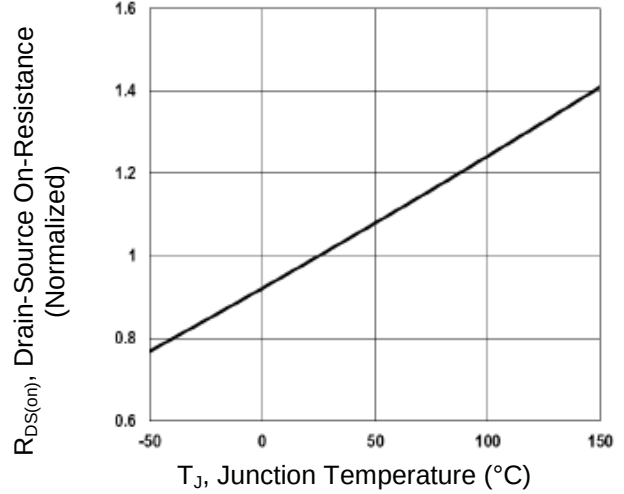
CHARACTERISTICS CURVES

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

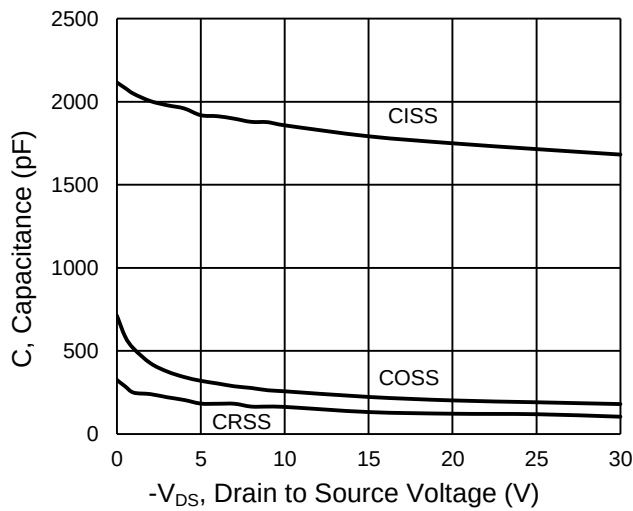
Normalized V_{th} vs. T_J



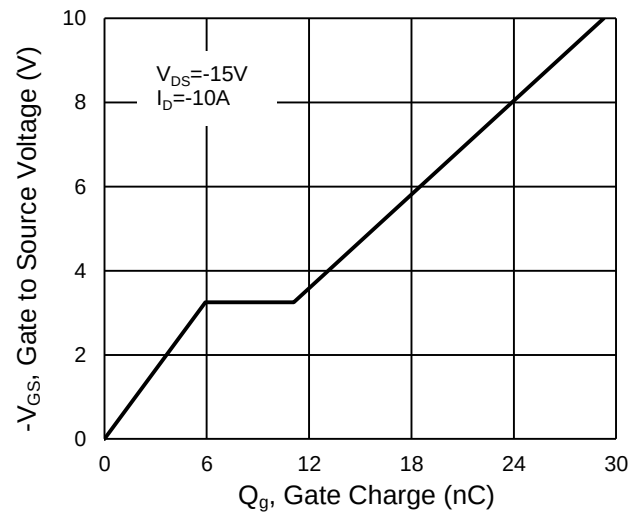
On-Resistance vs. Junction Temperature



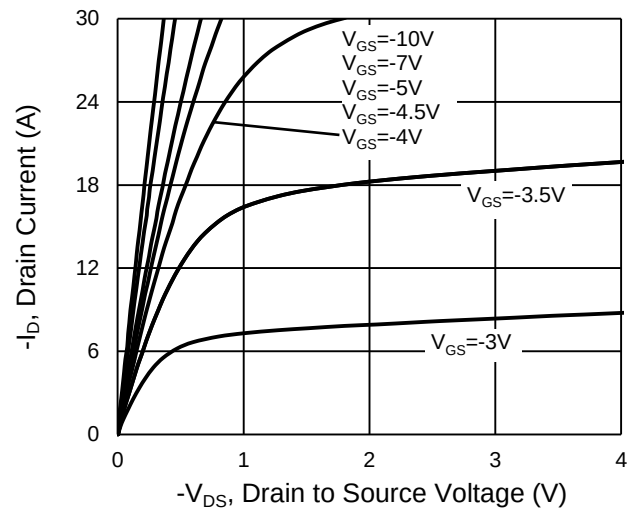
Capacitance vs. Drain-Source Voltage



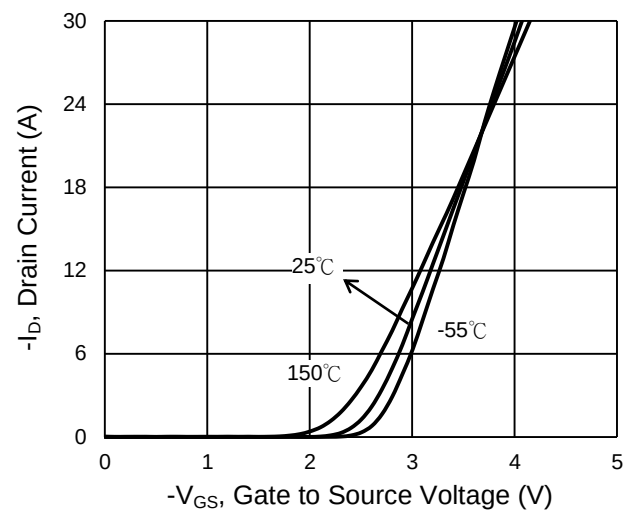
Gate-Source Voltage vs. Gate Charge



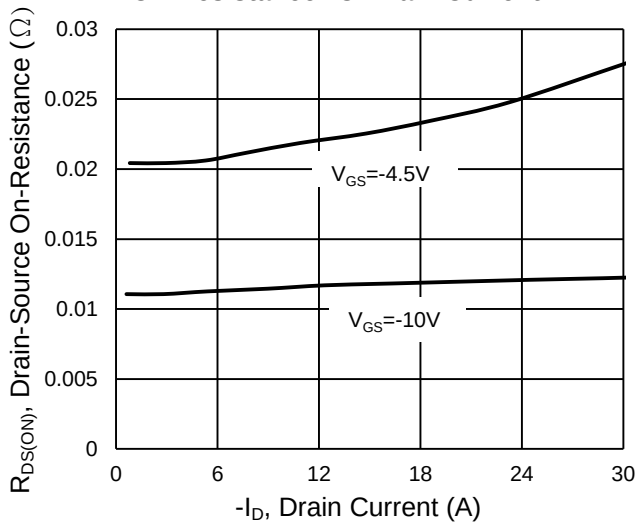
Output Characteristics



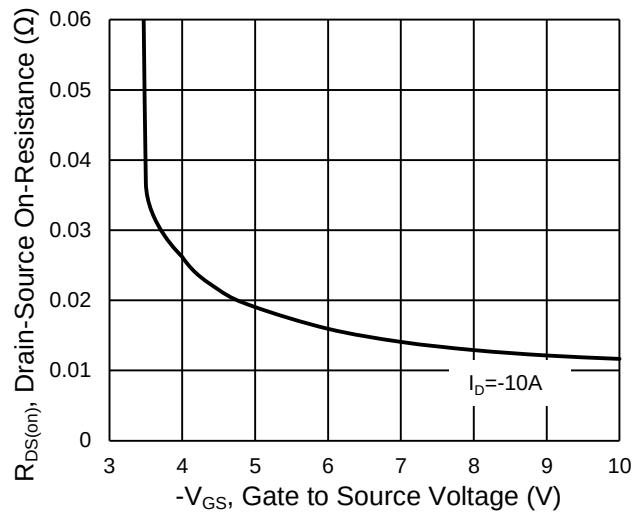
Transfer Characteristics



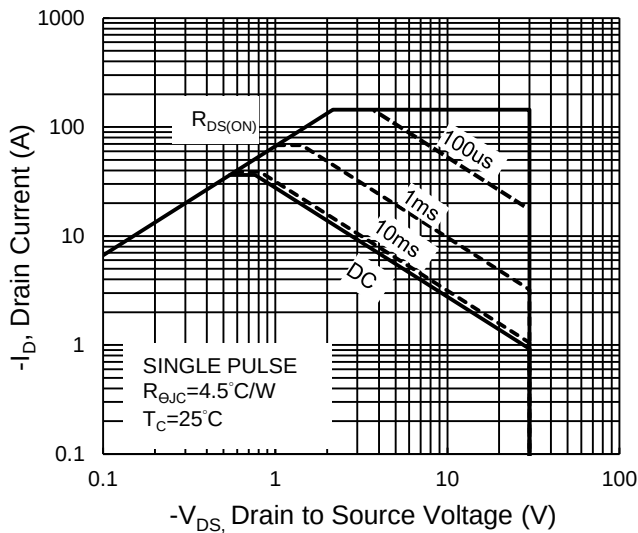
On-Resistance vs. Drain Current



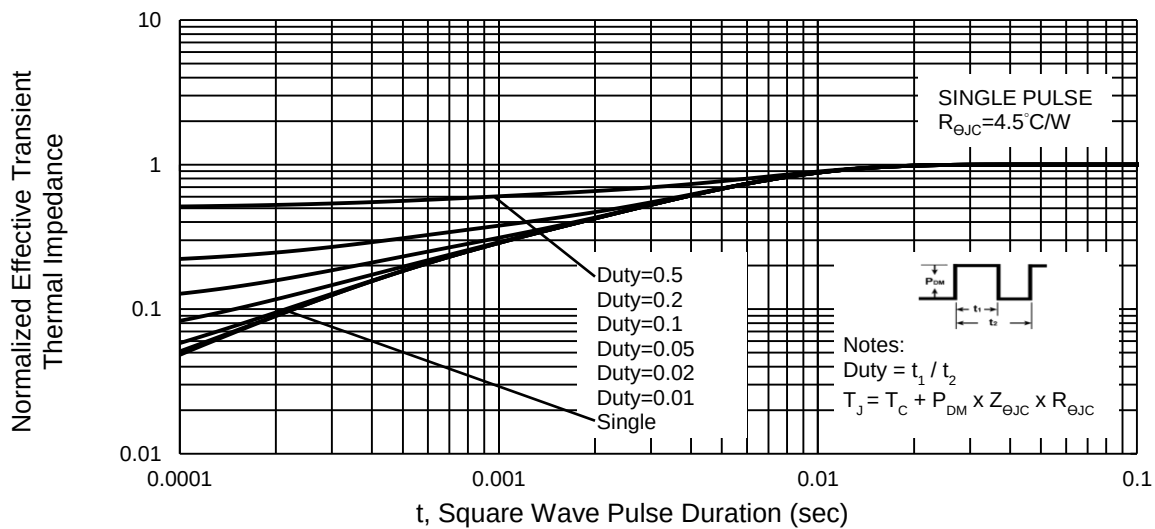
On-Resistance vs. Gate-Source Voltage



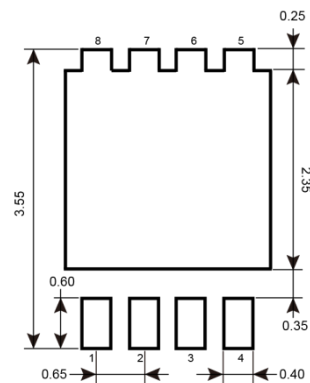
Maximum Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case



PDFN33



150P03
YML

L = Lot Code (1~9, A~Z)

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