P-Channel Enhancement Mode MOSFET
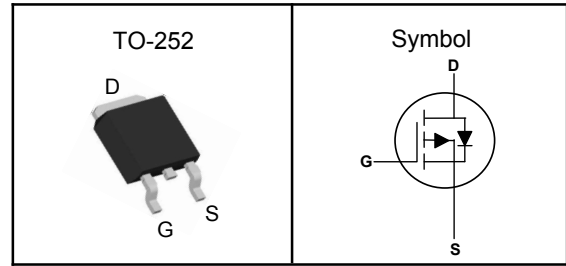
Features

- Advanced trench cell design
- Low Thermal Resistance
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

Applications

- Motor drivers
- DC - DC Converter

Pin Description

TO-252

Symbol

V_{DSS}	-30	V
$R_{DS(ON)-Typ}$	12	mΩ
I_D	-40	A

Absolute Maximum Ratings(T$_J$=25℃, Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±25	V
T_J	Maximum Junction Temperature		-55 to 150	℃
T_{STG}	Storage Temperature Range		-55 to 150	℃
I_{DM}[①]	Pulse Drain Current Tested		-160	A
I_D	Continuous Drain Current	T$_C$=25°C	-40	A
P_D	Maximum Power Dissipation	T$_C$=25°C	39	W
I_{AS}[②]	Avalanche Current, Single pulse	L=0.1mH	-23	A
E_{AS}[②]	Avalanche Energy, Single pulse	L=0.5mH	75	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$[③]	Thermal Resistance-Junction to Ambient	56	℃/W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.2	℃/W

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature 150℃.

Note ③ : Surface Mounted on 1in^2 FR-4 board with 1oz.

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Electrical Characteristics (T$_J$=25℃, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V, I$_D$=-250uA	-30	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=-30V, V$_{GS}$=0V	---	---	-1	uA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=-250uA	-1.1	---	-2.0	V
I$_{GSS}$	Gate Leakage Current	V$_{GS}$=±25V, V$_{DS}$=0V	---	---	±100	nA
R$_{DS(ON)}$	Drain-Source On-state Resistance	V$_{GS}$=-10V, I$_D$=-10A	---	12	15	mΩ
		V$_{GS}$=-4.5V, I$_D$=-5A	---	16	22	mΩ
Dynamic Characteristics[5]						
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=-15V, Freq.=1MHz	---	1230	---	pF
C$_{oss}$	Output Capacitance		---	160	---	
C$_{rss}$	Reverse Transfer Capacitance		---	145	---	
T$_{d(on)}$	Turn-on Delay Time	V$_{GS}$=-10V,V$_{DD}$=-15V, I$_D$=-20A,R$_G$=3Ω	---	18	---	nS
T$_r$	Turn-on Rise Time		---	22	---	
T$_{d(off)}$	Turn-off Delay Time		---	55	---	
T$_f$	Turn-off Fall Time		---	42	---	
Q$_g$	Total Gate Charge	V$_{GS}$=-10V,V$_{DD}$=-15 V , I$_D$=-10A	---	26.4	---	nC
Q$_{gs}$	Gate-Source Charge		---	6	---	
Q$_{gd}$	Gate-Drain Charge		---	4.3	---	
Source-Drain Characteristics						
V$_{SD}$[4]	Diode Forward Voltage	I$_S$=-1A, V$_{GS}$=0V	---	---	-1.0	V

Note ④： Pulse test (pulse width≤300us, duty cycle≤2%).

Note ⑤ : Guaranteed by design, not subject to production testing.

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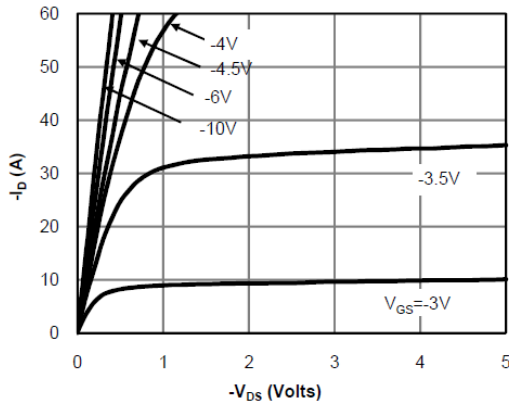## Typical Characteristics

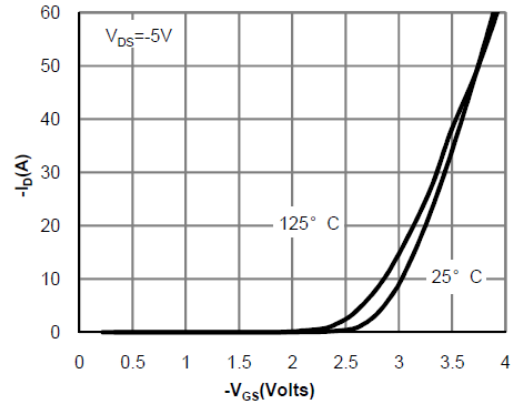Figure 1. On-Regin Characteristics
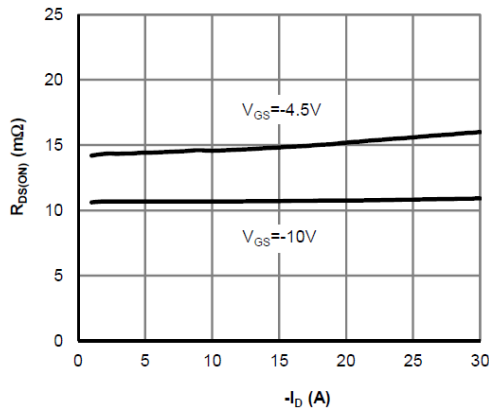

Figure 2. Transfer Characteristics

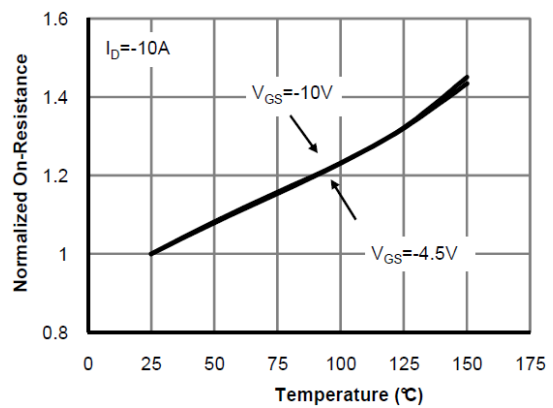Figure 3. On-Resistance vs. Drain Current and Gate Voltage

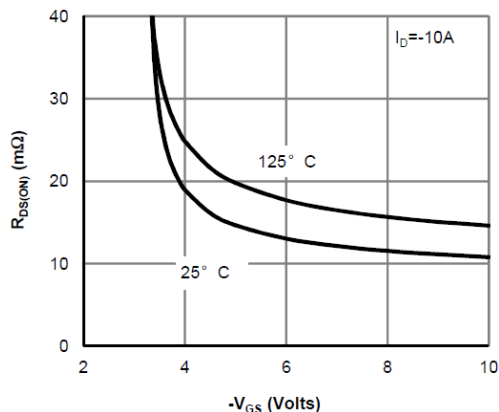Figure 4. On-Resistance vs. Junction Temperature
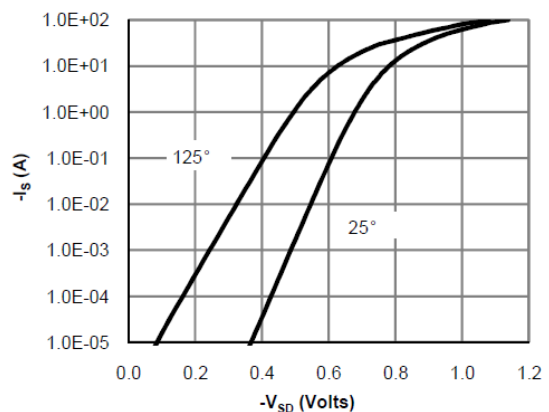

Figure 5. On-Resistance vs. Gate-Source Voltage

Figure 6. Body-Diode Characteristics

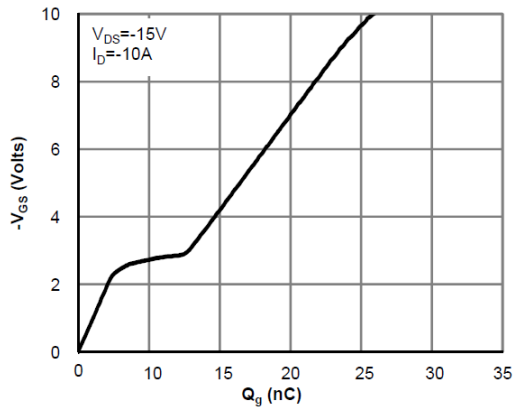# P-Channel Enhancement Mode MOSFET
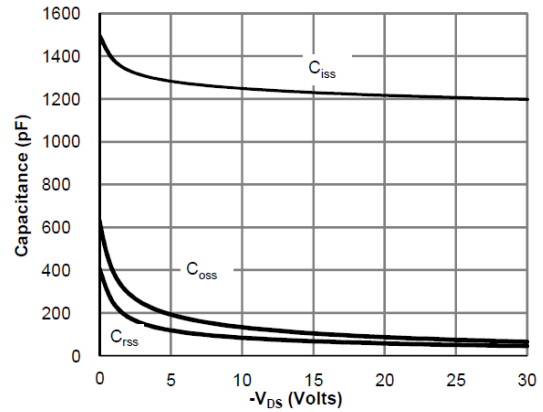

Figure 7. Gate-Charge Characteristics

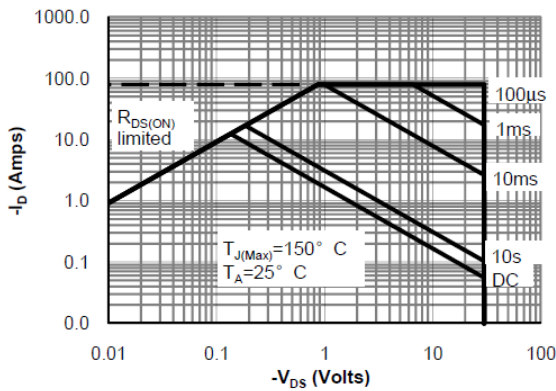Figure 8. Capacitance Characteristics

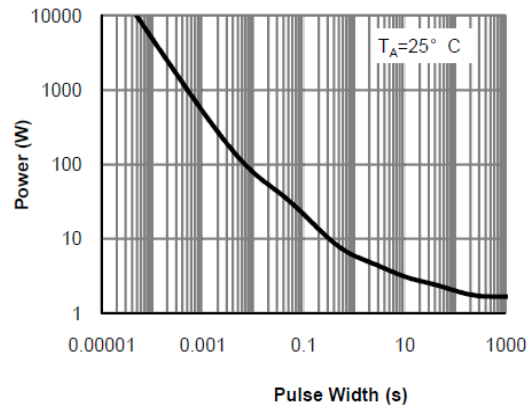Figure 9. Maximum Forward Biased Safe Operating Area

Figure 10. Single Pulse Power Rating Junction-to-Ambient
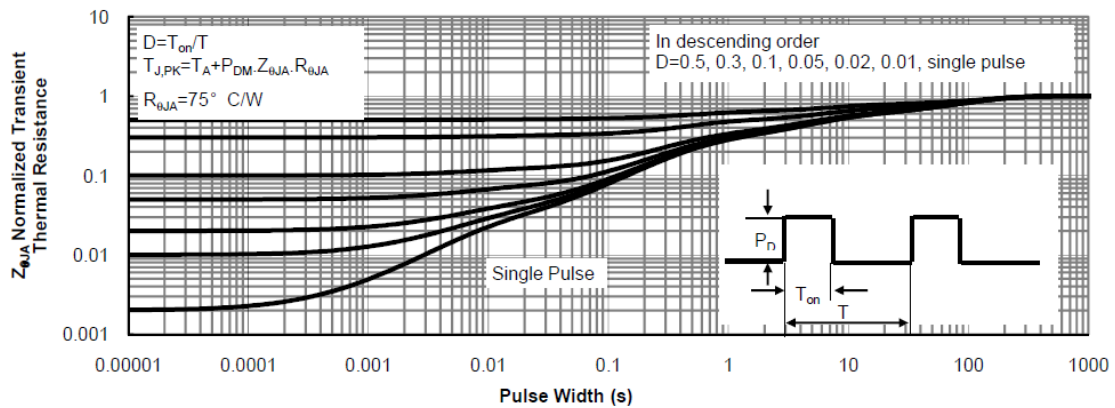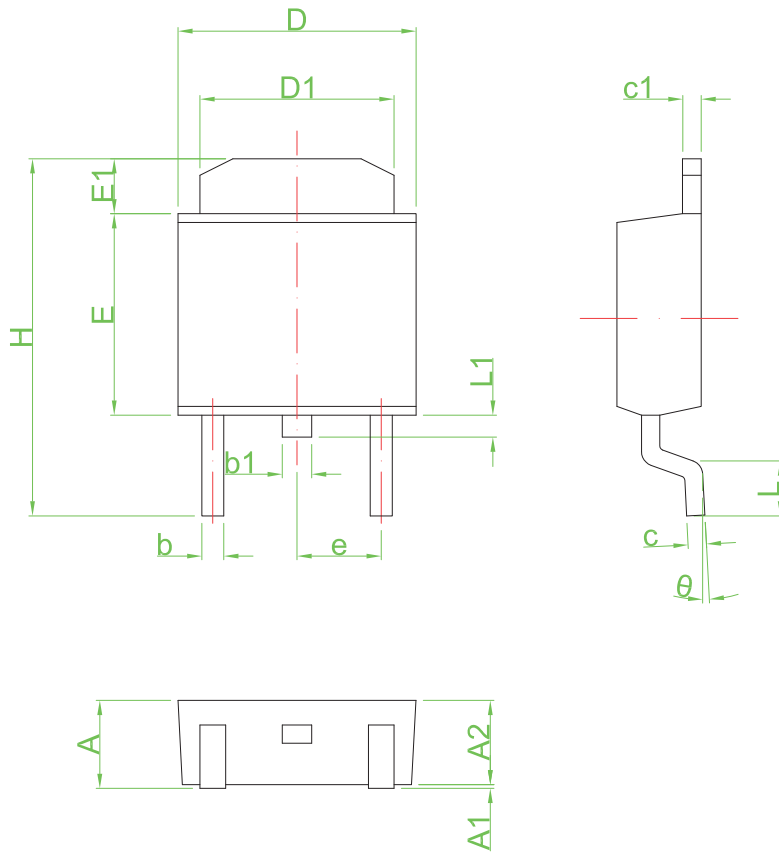

Figure 11. Normalized Maximum Transient Thermal Impedance

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TO-252 Package Outline Dimensions

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.25	2.65	0.089	0.104
A1	0.00	0.15	0.000	0.006
A2	2.20	2.40	0.087	0.094
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.46	0.66	0.018	0.026
c1	0.46	0.66	0.018	0.026
D	6.30	6.70	0.248	0.264
D1	5.20	5.40	0.205	0.213
E	5.30	5.70	0.209	0.224
E1	1.40	1.60	0.055	0.063
H	9.40	9.90	0.370	0.390
e	2.30 TYP		0.09 TYP	
L	1.40	1.77	0.055	0.070
L1	0.50	0.70	0.020	0.028
θ	0°	8°	0°	8°