

P-Channel Enhancement Mode MOSFET

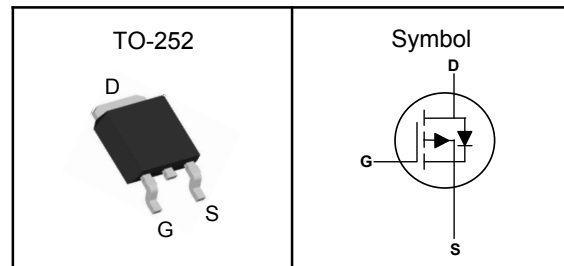
Features

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

Applications

- Motor drivers
- DC - DC Converter

Pin Description



V _{bss}	-30	V
R _{DS(ON)-Typ}	9	mΩ
I _D	-50	A

Absolute Maximum Ratings (T_C=25°C, Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
V _{bss}	Drain-Source Voltage	-30	V
V _{GSS}	Gate-Source Voltage	±20	V
T _J	Maximum Junction Temperature	-55 to 150	°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
I _{DM} ^①	Pulse Drain Current Tested	-200	A
I _D	Continuous Drain Current	-50	A
P _D	Maximum Power Dissipation	62.5	W
E _{AS}	Single Pulse Avalanche Energy	225	mJ

Thermal Characteristics

Symbol	Parameter	Rating	Unit
R _{θJA}	Thermal Resistance-Junction to Ambient	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ₁	2	°C/W

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

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

Note ③ : Surface Mounted on 1in² FR-4 board with 1oz.

**P-Channel Enhancement Mode MOSFET****Electrical Characteristics** ($T_J=25^\circ\text{C}$, Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static Electrical Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V$	---	---	-1	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	---	-2.2	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_D=-12A$	---	9	12	$m\Omega$
		$V_{GS}=-4.5V, I_D=-7A$	---	12	17	$m\Omega$
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-25A$	---	25	---	S
Dynamic Characteristics ^⑤						
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=-15V,$ Freq.=1MHz	---	1780	---	pF
C_{oss}	Output Capacitance		---	230	---	
C_{rss}	Reverse Transfer Capacitance		---	210	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{DS}=-15V, V_{GS}=-10V,$ $R_G=3\Omega, I_D=-25A$	---	13	---	nS
T_r	Turn-on Rise Time		---	8.8	---	
$T_{d(off)}$	Turn-off Delay Time		---	26	---	
T_f	Turn-off Fall Time		---	12	---	
Q_g	Total Gate Charge	$V_{DS}=-15V,$ $V_{GS}=-10V, I_D=-25A$	---	32	---	nC
Q_{gs}	Gate-Source Charge		---	6.7	---	
Q_{gd}	Gate-Drain Charge		---	10.2	---	
Source-Drain Characteristics						
V_{SD} ^④	Diode Forward Voltage	$V_{GS}=0V, I_S=-10A, T_J=25^\circ\text{C}$	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-25A,$ $di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	32	---	nS
Q_{rr}	Reverse Recovery Charge		---	22	---	nC

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

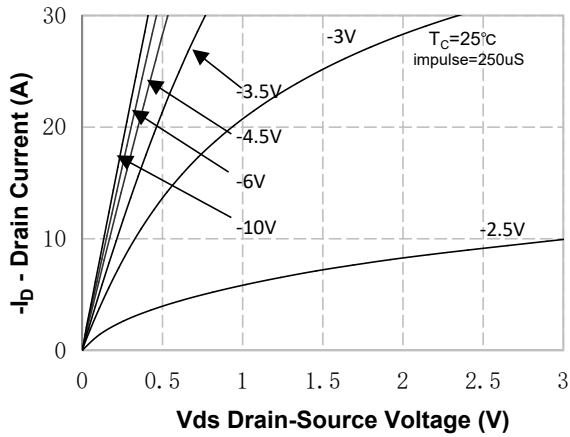


Figure 1. On-Region Characteristics

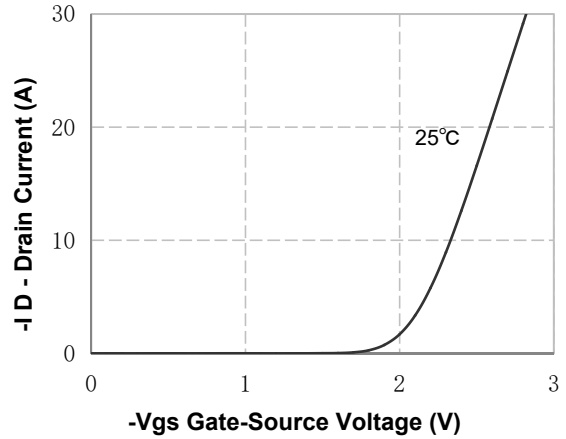


Figure 2. Transfer Characteristics

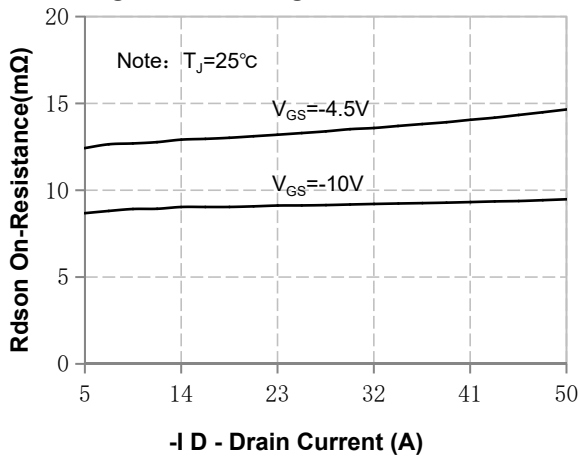


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

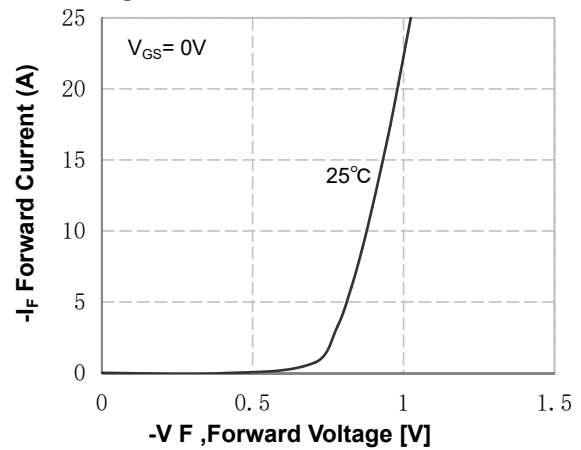


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

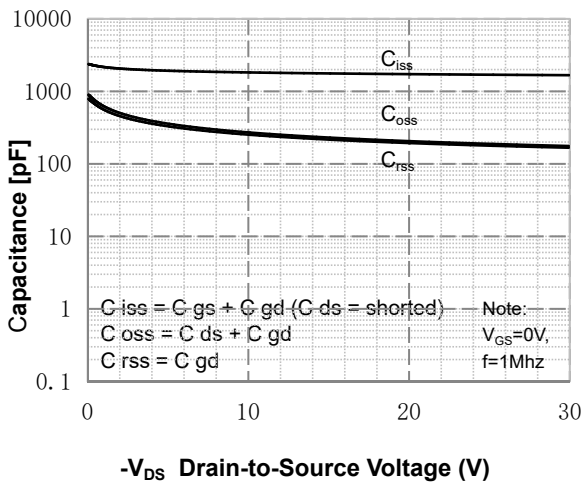


Figure 5. Capacitance Characteristics

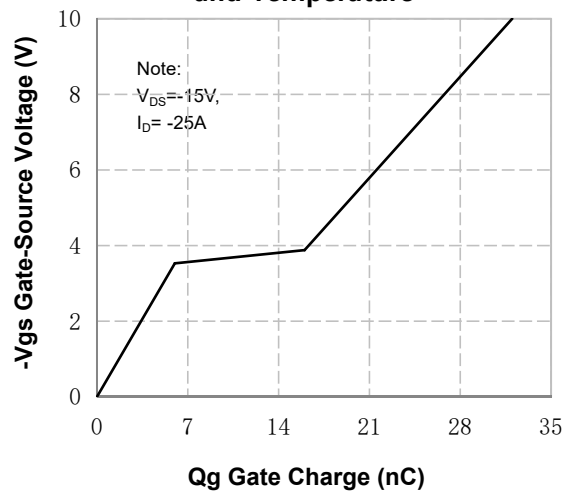


Figure 6. Gate Charge Characteristics

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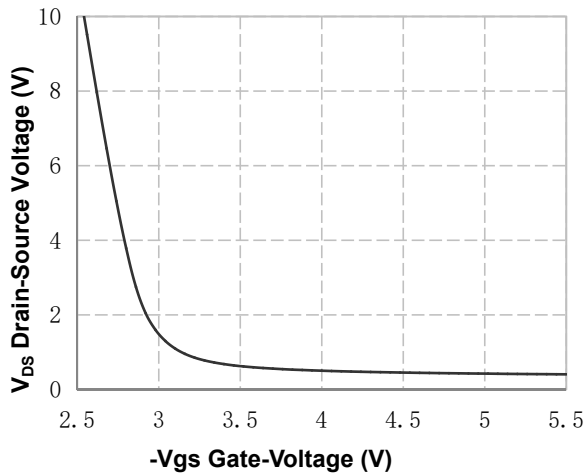


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

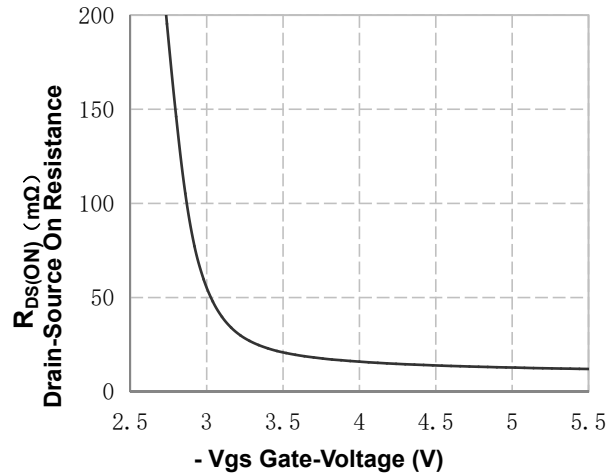


Figure 8. On-Resistance vs Gate Voltage

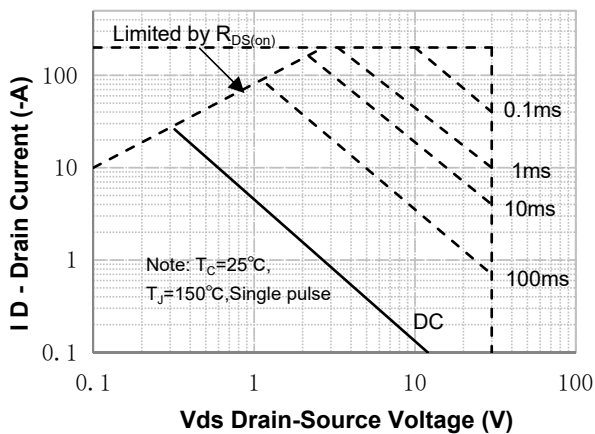


Figure 9. Maximum Safe Operating Area

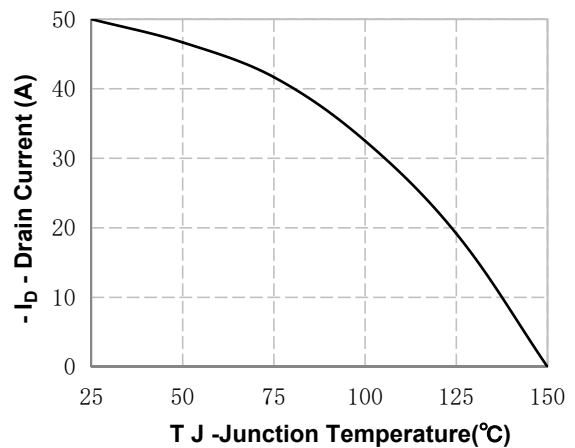


Figure 10. Maximum Continuous Drain Current vs Temperature

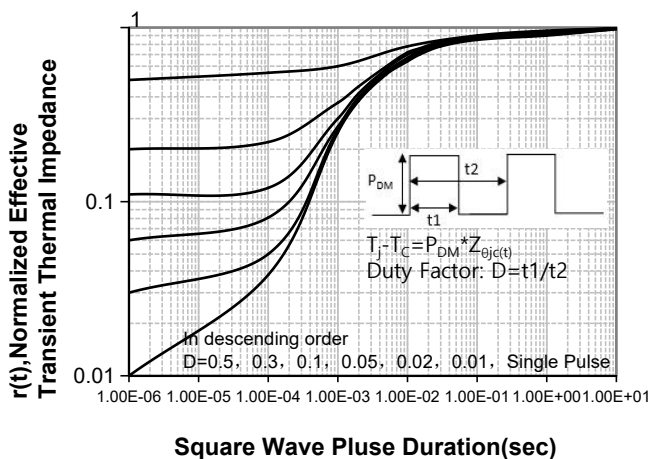
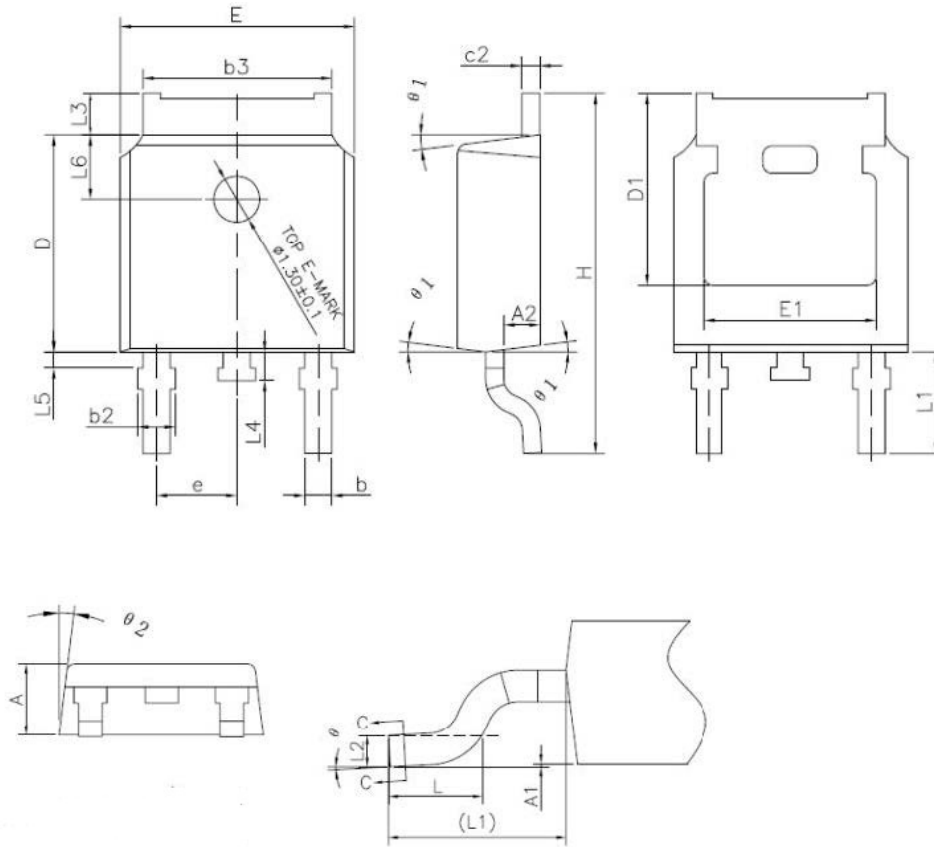


Figure 11. Transient Thermal Response Curve

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TO-252 Package Outline Dimensions


Symbol	Dimensions (unit:mm)			Symbol	Dimensions (unit:mm)		
	Min	Typ	Max		Min	Typ	Max
A	2.20	2.30	2.38	E₁	4.70	--	--
A₁	--	--	0.10	e	2.18	2.29	2.39
A₂	0.90	1.00	1.10	H	9.80	10.10	10.40
b	0.72	--	0.85	L	1.40	1.50	1.70
c	0.47	--	0.60	L₁	2.90 REF		
C₂	0.47	--	0.60	L₂	0.508 BSC		
D	6.00	6.10	6.20	L₃	0.90	--	1.25
D₁	5.25	--	--	L₄	0.60	0.80	1.00
E	6.50	6.60	6.70	L₅	0.15	--	0.75