

## P-Channel Enhancement Mode MOSFET

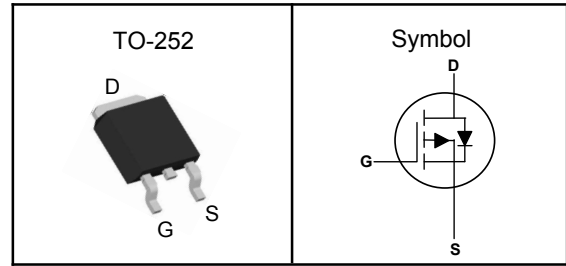
### Features

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

### Applications

- Motor drivers
- DC - DC Converter

### Pin Description



$V_{DSS}$	-40	V
$R_{DS(ON)-Typ}$	6.2	m $\Omega$
$I_D$	-80	A

### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit
$V_{DSS}$	Drain-Source Voltage	-40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$T_J$	Maximum Junction Temperature	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$I_{DM}^{①}$	Pulse Drain Current Tested	-320	A
$I_D$	Continuous Drain Current	-80	A
$P_D$	Maximum Power Dissipation	81	W
$E_{AS}$	Single Pulse Avalanche Energy	101	mJ

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	54	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance-Junction to Case	1.54	$^\circ\text{C}/\text{W}$

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

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  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
<b>Static Electrical Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-40V, V_{GS}=0V$	---	---	-1	$\mu A$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	---	-2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS}=-10V, I_D=-20A$	---	6.2	8.0	m $\Omega$
		$V_{GS}=-4.5V, I_D=-15A$	---	8.2	11	m $\Omega$
<b>Dynamic Characteristics<sup>⑤</sup></b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0V, V_{DS}=-20V, \text{Freq.}=1\text{MHz}$	---	5295	---	pF
$C_{oss}$	Output Capacitance		---	430	---	
$C_{rss}$	Reverse Transfer Capacitance		---	385	---	
$T_{d(on)}$	Turn-on Delay Time	$V_{GS}=-10V, V_{DD}=-20V, I_D=-20A, R_G=3\Omega$	---	17	---	nS
$T_r$	Turn-on Rise Time		---	10	---	
$T_{d(off)}$	Turn-off Delay Time		---	65	---	
$T_f$	Turn-off Fall Time		---	17	---	
$Q_g$	Total Gate Charge	$V_{GS}=-10V, V_{DD}=-20V, I_D=-20A$	---	110	---	nC
$Q_{gs}$	Gate-Source Charge		---	12.5	---	
$Q_{gd}$	Gate-Drain Charge		---	23	---	
<b>Source-Drain Characteristics</b>						
$V_{SD}^{④}$	Diode Forward Voltage	$I_S=-20A, V_{GS}=0V$	---	---	-1.2	V

Note ④: Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

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

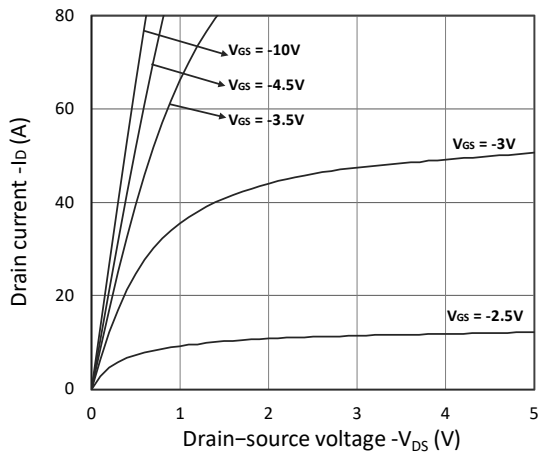
**P-Channel Enhancement Mode MOSFET**
**Typical Characteristics**


Figure 1. Output Characteristics

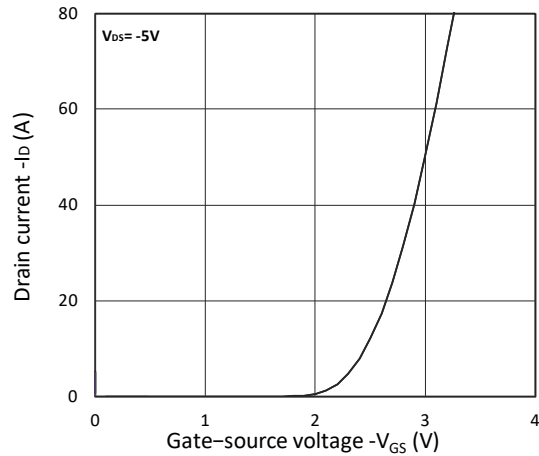


Figure 2. Transfer Characteristics

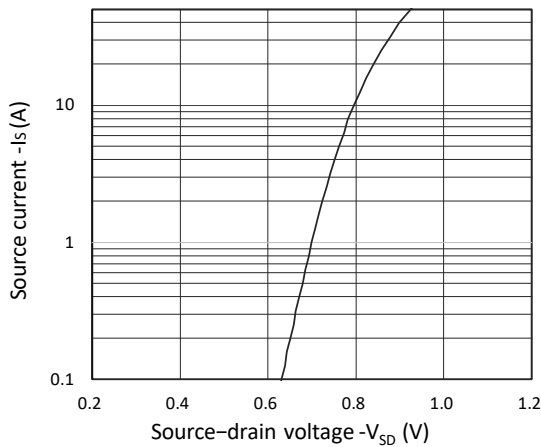
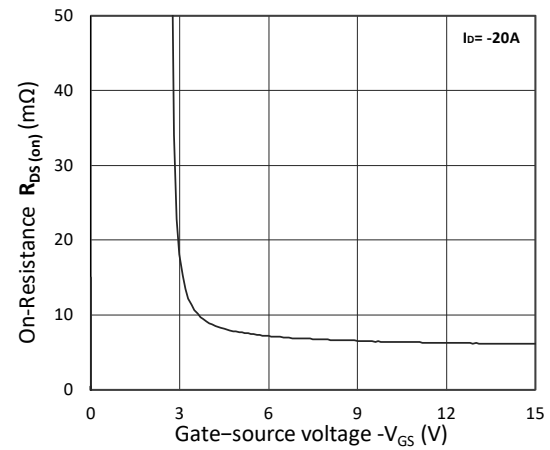
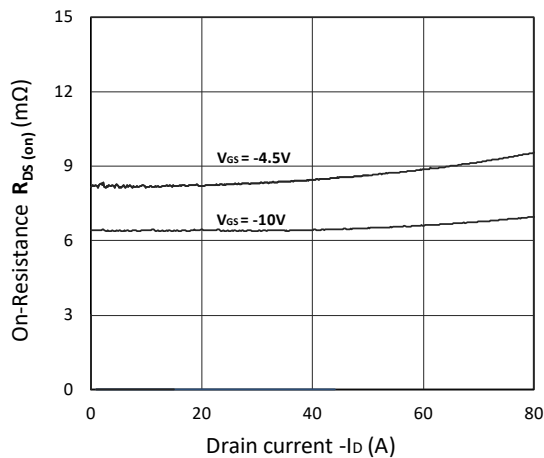
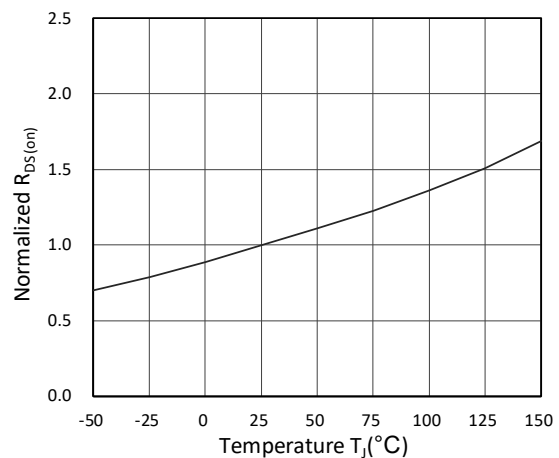


Figure 3. Forward Characteristics of Reverse


 Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$ 

 Figure 5.  $R_{DS(on)}$  vs.  $I_D$ 

 Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

**P-Channel Enhancement Mode MOSFET**

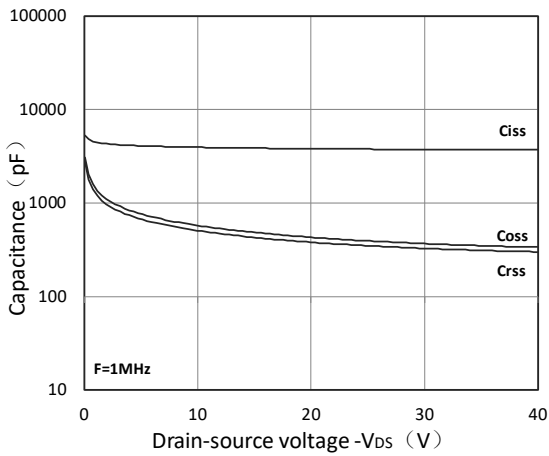


Figure 7. Capacitance Characteristics

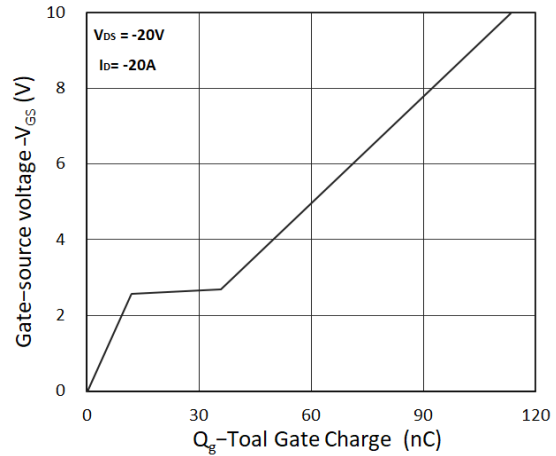


Figure 8. Gate Charge Characteristics

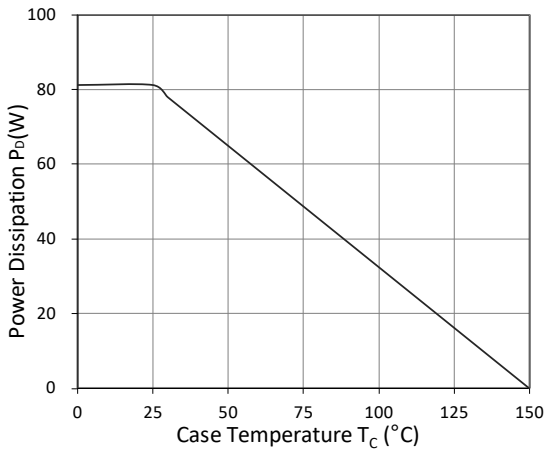


Figure 9. Power Dissipation

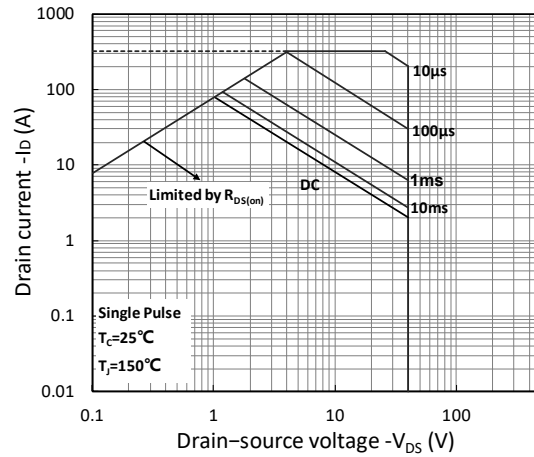


Figure 10. Safe Operating Area

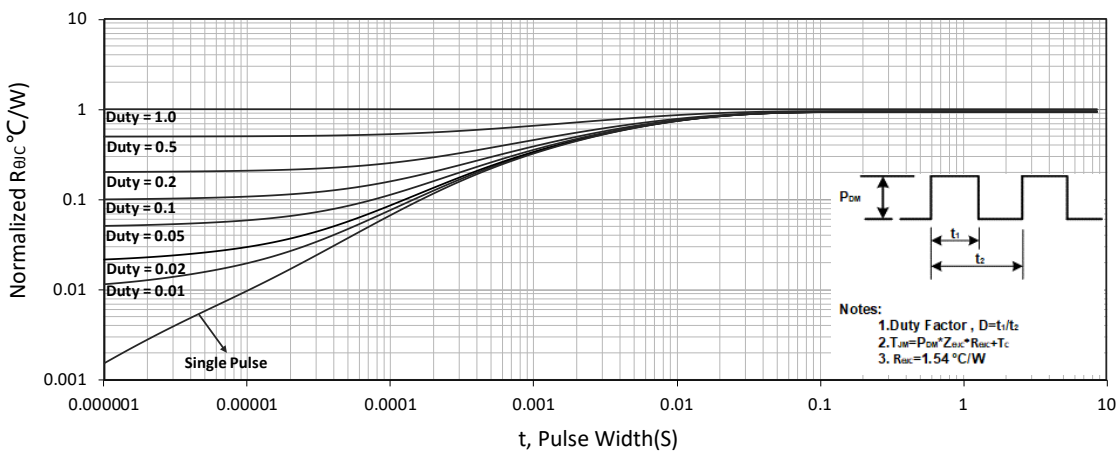
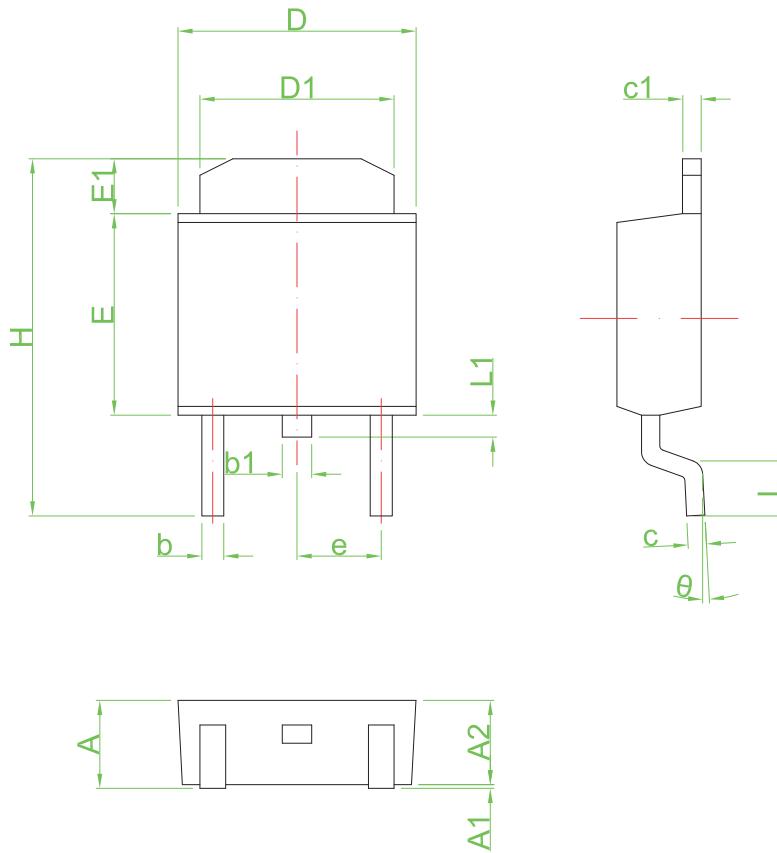


Figure 11. Normalized Maximum Transient Thermal Impedance

**P-Channel Enhancement Mode MOSFET**
**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°