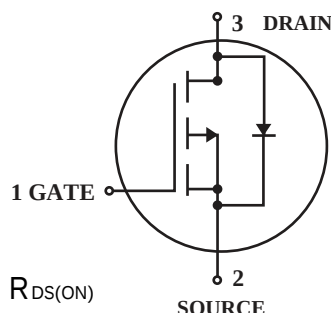


Surface Mount P-Channel Enhancement Mode POWER MOSFET

(Pb) Lead(Pb)-Free



DRAIN CURRENT

-20 AMPERES

DRAIN SOURCE VOLTAGE

-30 VOLTAGE

Features:

*Super High Dense Cell Design For Low $R_{DS(ON)}$

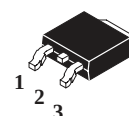
$R_{DS(ON)} < 50m\ \Omega @ V_{GS} = -10V$

*Simple Drive Requirement

*Lower On-resistance

*Fast Switching Characteristic

*TO-252 Package



1. GATE
2.4 DRAIN
3. SOURCE

D-PAK / (TO-252)

Maximum Ratings ($T_a = 25^\circ C$ Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current, ($V_{GS} @ 10V, T_C = 25^\circ C$) , ($V_{GS} @ 10V, T_C = 100^\circ C$)	I_D	-20 -13	A
Pulsed Drain Current ¹	I_{DM}	-72	
Total Power Dissipation ($T_C = 25^\circ C$)	P_D	31	W
Thermal Resistance Junction-case	$R_{\theta JC}$	4.0	$^\circ C/W$
Thermal Resistance Junction-ambient	$R_{\theta JA}$	110	$^\circ C/W$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ C$

Electrical Characteristics ($T_j = 25^\circ\text{C}$ Unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit
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Static

Drain-Source Breakdown Voltage $I_D = -250\mu\text{A}, V_{GS} = 0$	BV_{DSS}	-30	-	-	V
Gate-Source Threshold Voltage $I_D = -250\mu\text{A}, V_{DS} = V_{GS}$	$V_{GS(Th)}$	-1.0	-	3.0	
Gate-Source Leakage current $V_{GS} = \pm 20\text{V}$	I_{GSS}	-	-	± 100	nA
Drain-Source Leakage Current ($T_j = 25^\circ\text{C}$) $V_{DS} = -30\text{V}, V_{GS} = 0$	I_{DSS}	-	-	-1	μA
Drain-Source Leakage Current ($T_j = 70^\circ\text{C}$) $V_{DS} = -24\text{V}, V_{GS} = 0$		-	-	-25	
Static Drain-Source On-Resistance ² $I_D = -10\text{A}, V_{GS} = -10\text{V}$ $I_D = -5\text{A}, V_{GS} = -4.5\text{V}$	$R_{DS(on)}$	- -	- -	50 90	$\text{m}\Omega$
Forward Transconductance $I_D = -10\text{A}, V_{DS} = -10\text{V}$	g_{fs}	-	9.6	-	S

Dynamic

Input Capacitance $V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1.0\text{MHz}$	C_{iss}	-	463	740	pF
Output Capacitance $V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1.0\text{MHz}$	C_{oss}	-	187	-	
Reverse Transfer Capacitance $V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1.0\text{MHz}$	C_{rss}	-	140	-	

Switching

Turn-on Delay Time ² $I_D = -10A, V_{DS} = -15V, V_{GS} = -10V, R_G = 3.3\Omega, R_D = 1.5\Omega$	$T_{d(on)}$	-	9.6	-	ns
Rise Time $I_D = -10A, V_{DS} = -15V, V_{GS} = -10V, R_G = 3.3\Omega, R_D = 1.5\Omega$	T_r	-	18	-	
Turn-off Delay Time $I_D = -10A, V_{DS} = -15V, V_{GS} = -10V, R_G = 3.3\Omega, R_D = 1.5\Omega$	$T_{d(off)}$	-	19	-	
Fall Time $I_D = -10A, V_{DS} = -15V, V_{GS} = -10V, R_G = 3.3\Omega, R_D = 1.5\Omega$	T_f	-	14	-	
Total Gate CHarge ² $I_D = -10A, V_{DS} = -24V, V_{GS} = -4.5V$	Q_g	-	10	-	nC
Gate-Source Charge $I_D = -10A, V_{DS} = -24V, V_{GS} = -4.5V$	Q_{gs}	-	3	-	
Gate-Drain ("Miller") Charge $I_D = -10A, V_{DS} = -24V, V_{GS} = -4.5V$	Q_{gd}	-	5	-	

Source-Drain Diode Characteristics

Forward On Voltage ² $I_S = -10A, V_{GS} = 0V$	V_{SD}	-	-	-1.2	V
Reverse Recovery Time $I_S = -10A, V_{GS} = 0V \quad dI/dt = 100A/\mu s$	T_{rr}	-	34	-	ns
Reverse Recovery Charge $I_S = -10A, V_{GS} = 0V \quad dI/dt = 100A/\mu s$	Q_{rr}	-	30	-	nc

Note: 1. Pulse width limited by safe operating area.
2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Characteristics Curve

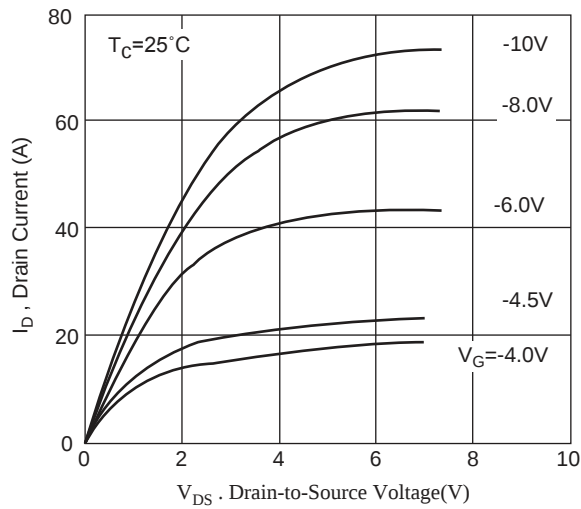


Fig.1 Typical Output Characteristics

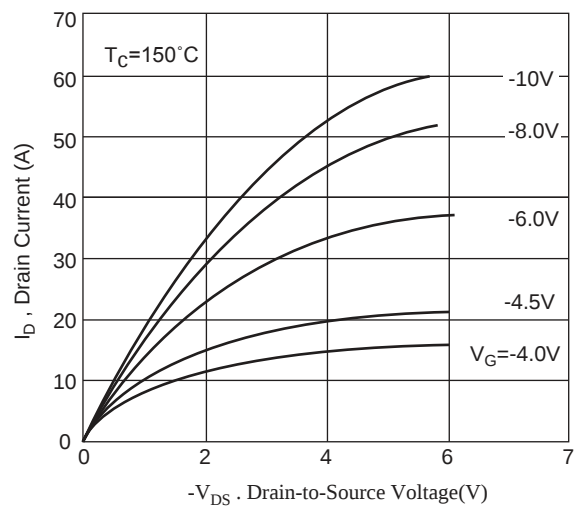


Fig.2 Typical Output Characteristics

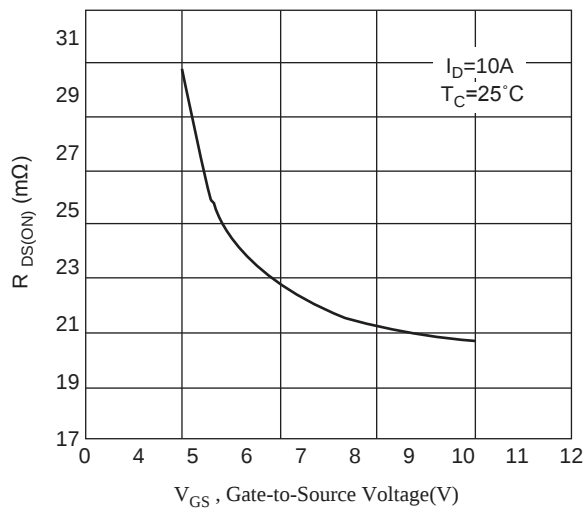


Fig.3 On-Resistance v.s. Gate Voltage

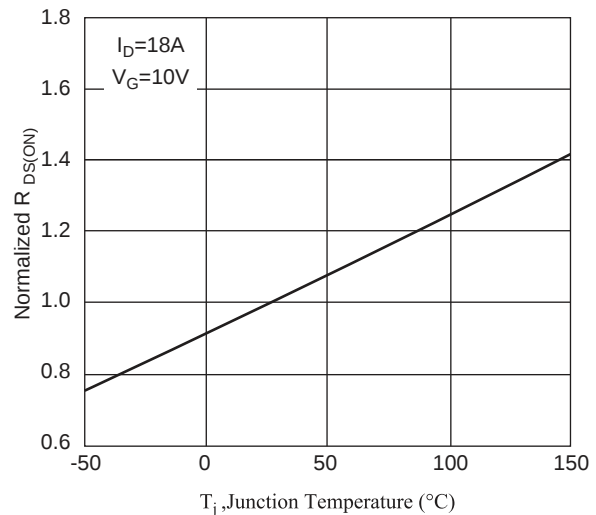


Fig.4 Normalized OnResistance

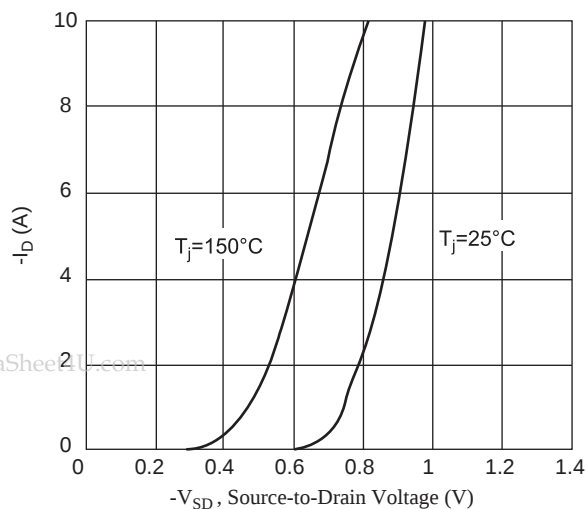


Fig.5 Forward Characteristic of Reverse Diode

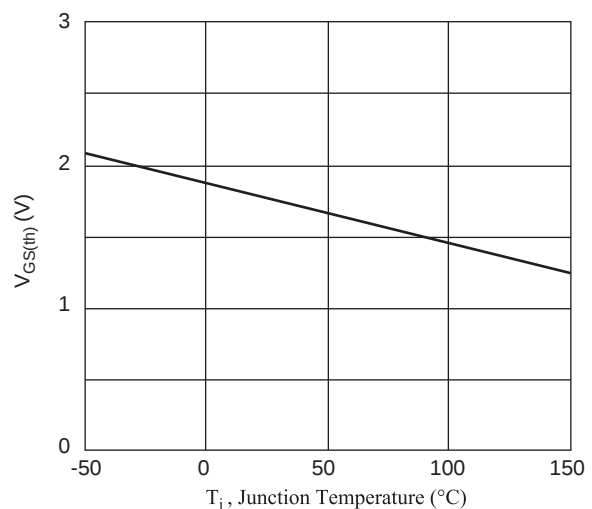


Fig.6 Gate Threshold Voltage v.s. Junction Temperature

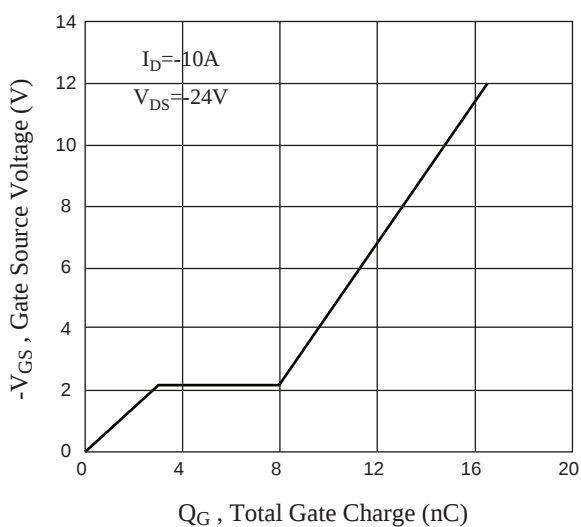


Fig 7. Gate Charge Characteristics

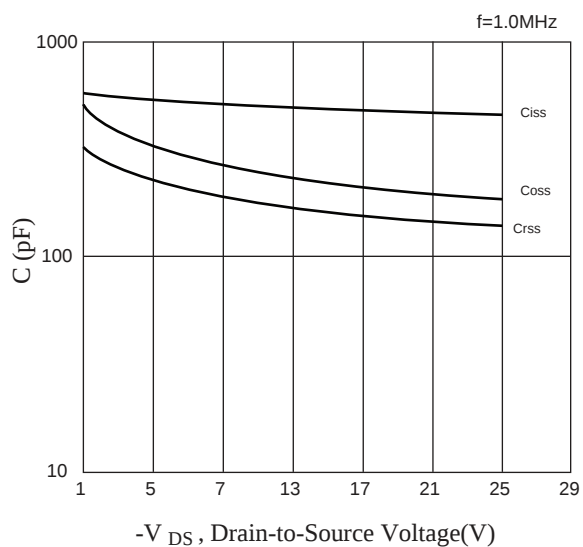


Fig 8. Effective Transient Thermal Impedance

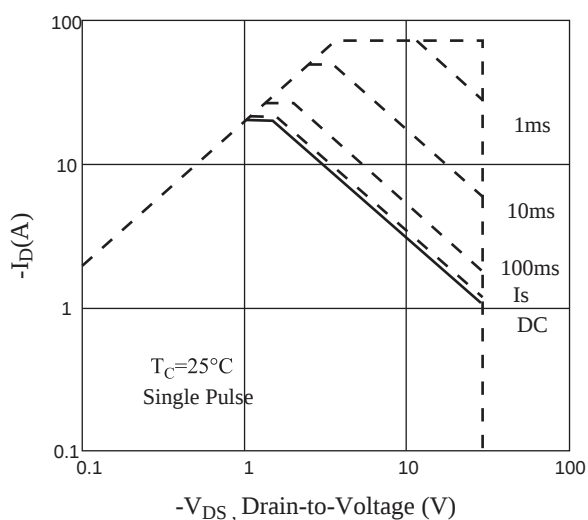


Fig 9. Maximum Safe Operating Area

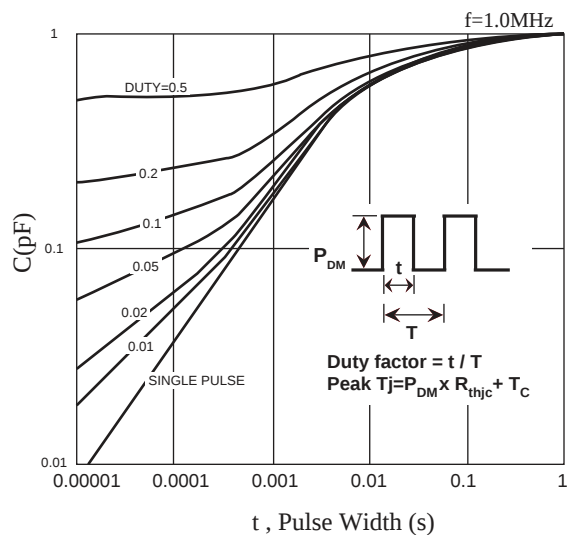


Fig 10. Effective Transient Thermal Impedance

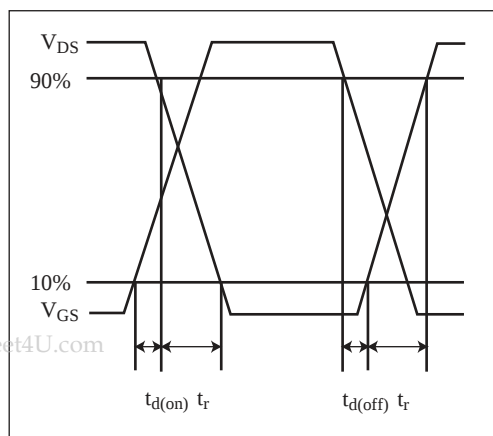


Fig 11. Switching Time Waveform

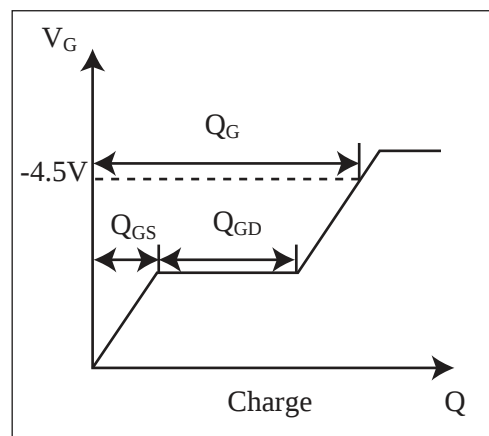
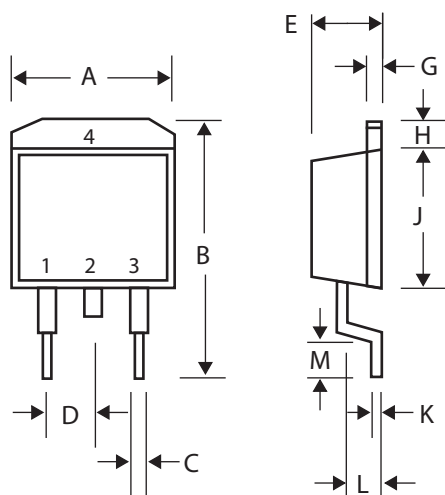


Fig.12 Gate Charge Waveform

D-PAK / (TO-252) Outline Dimension

Unit:mm



D-PAK		
Dim	Min	Max
A	6.40	6.80
B	9.00	10.00
C	0.50	0.80
D	-	2.30
E	2.20	2.50
G	0.45	0.55
H	1.00	1.60
J	5.40	5.80
K	0.30	0.64
L	0.70	1.70
M	0.90	1.50