

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	---	0.07	---	$\text{V}/^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=15A$	---	28	34	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	33	40	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-4.6	---	$\text{mV}/^{\circ}\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=8A$	---	8	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2, 3}	Q_g	$V_{DS}=30V, V_{GS}=10V, I_D=20A$	---	16.6	24	nC
Gate-Source Charge ^{2, 3}	Q_{gs}		---	2.2	4.4	
Gate-Drain Charge ^{2, 3}	Q_{gd}		---	3.9	8	
Turn-On Delay Time ^{2, 3}	$T_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	4.6	9	nS
Rise Time ^{2, 3}	T_r		---	14.8	28	
Turn-Off Delay Time ^{2, 3}	$T_{d(off)}$		---	27.2	52	
Fall Time ^{2, 3}	T_f		---	7.8	15	
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, F=1\text{MHz}$	---	1180	1720	pF
Output Capacitance	C_{oss}		---	68	100	
Reverse Transfer Capacitance	C_{rss}		---	45	70	
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.1	4.2	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	25	A
Pulsed Source Current	I_{SM}		---	---	100	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V
Reverse Recovery Time ²	t_{rr}	$V_{GS}=0V, I_S=1A, di/dt=100\text{A}/\mu\text{s}$	---	17	---	nS
Reverse Recovery Charge ²	Q_{rr}	$T_J=25^{\circ}\text{C}$	---	12	---	nC

Notes:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=22A, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

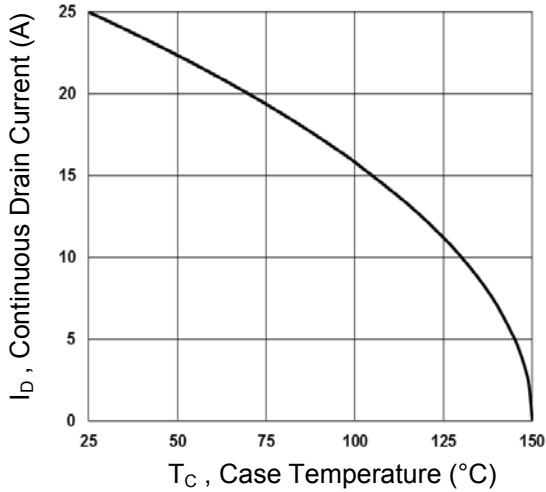


Fig.1 Continuous Drain Current vs. T_c

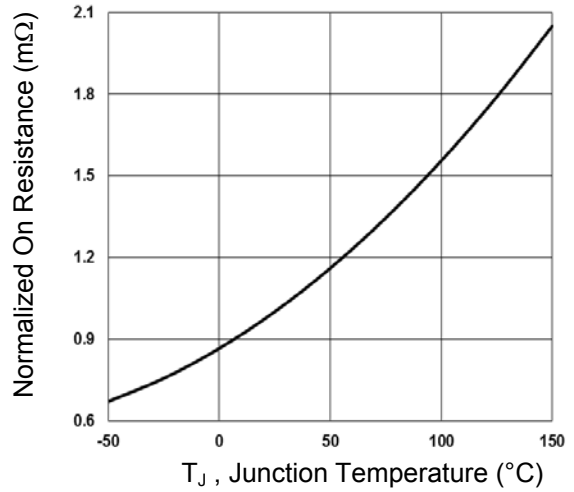


Fig.2 Normalized $R_{DS(ON)}$ vs. T_j

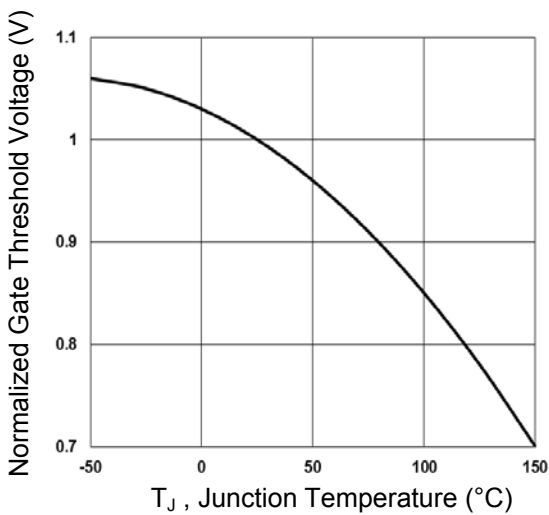


Fig.3 Normalized V_{th} vs. T_j

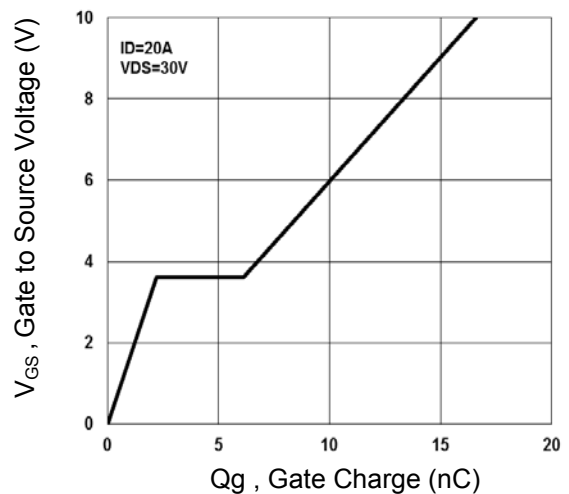


Fig.4 Gate Charge Waveform

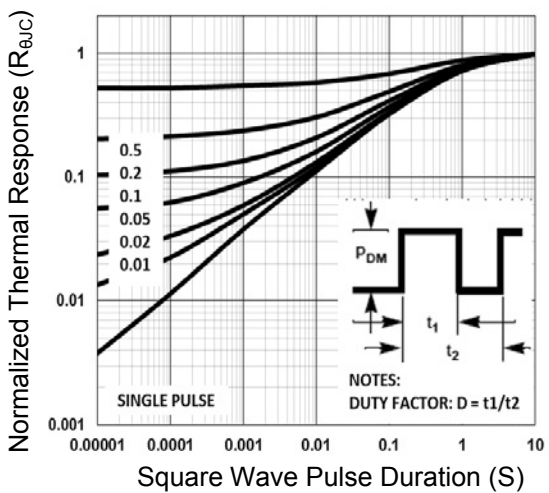


Fig.5 Normalized Transient Impedance

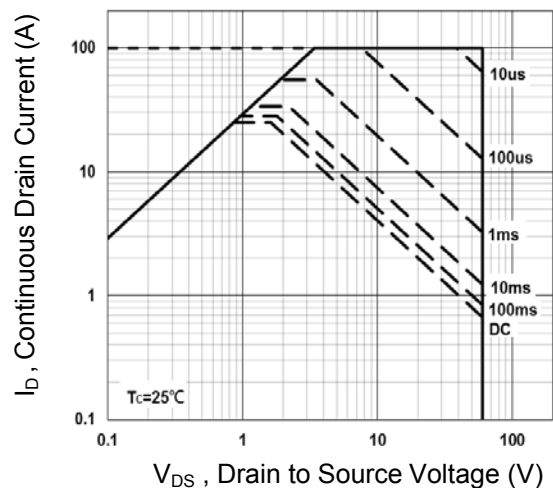


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

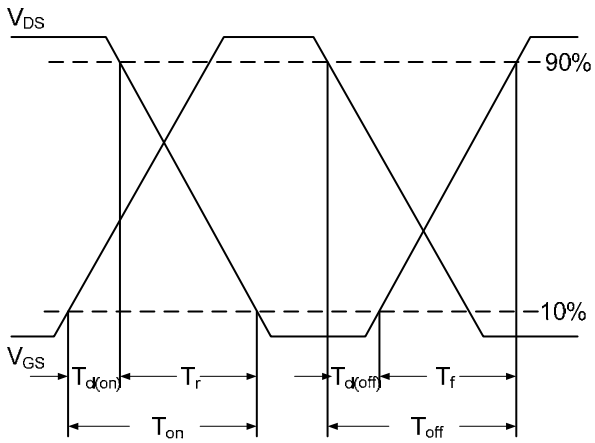


Fig.7 Switching Time Waveform

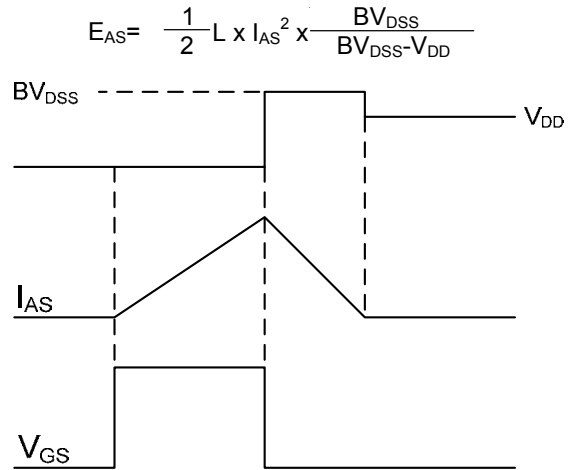
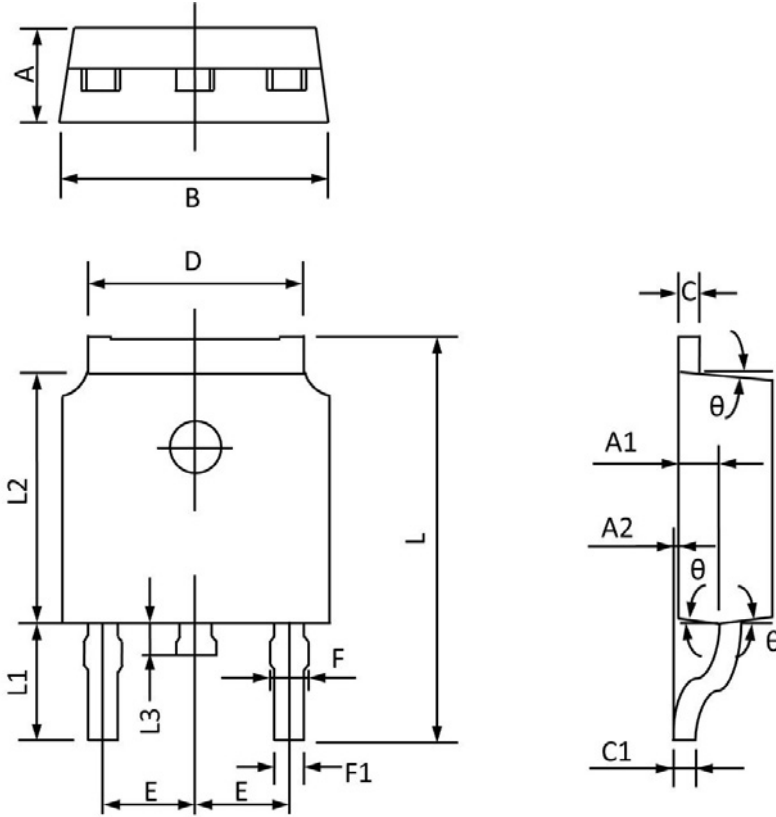


Fig.8 E_{AS} Waveform

Package Outline Dimensions

TO-252 (DPAK)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.20	2.40	0.087	0.094
A1	0.91	1.11	0.036	0.044
A2	0.00	0.15	0.000	0.006
B	6.50	6.70	0.256	0.264
C	0.46	0.580	0.018	0.230
C1	0.46	0.580	0.018	0.030
D	5.10	5.46	0.201	0.215
E	2.186	2.386	0.086	0.094
F	0.74	0.94	0.029	0.037
F1	0.660	0.860	0.026	0.034
L	9.80	10.40	0.386	0.409
L1	2.9REF		0.114REF	
L2	6.00	6.20	0.236	0.244
L3	0.60	1.00	0.024	0.039
θ	3°	9°	3°	9°