

Features

- 200V/135A,
 $R_{DS(on)} = 11m\Omega(Typ.)@V_{GS}=10V$
- Excellent $Q_G \times R_{DS(on)}$ product(FOM)
- SGT Technology
- High Ruggedness
- 100% Avalanche Tested

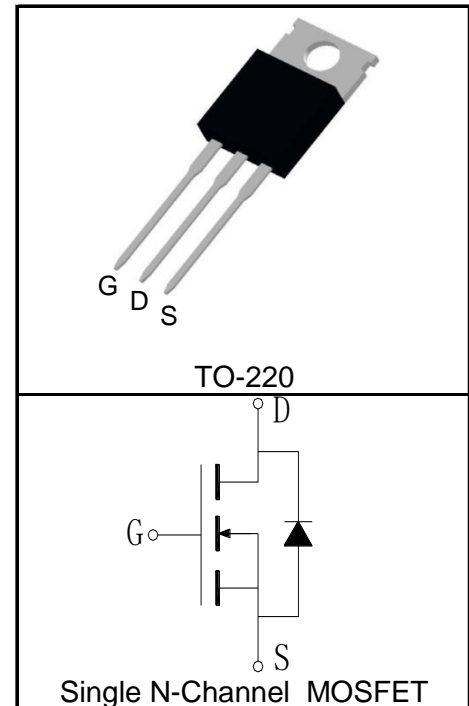
Applications

- Motor Control
- Battery Power Management
- Inverter



Halogen-Free

Pin Description



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage	200	V	
V_{GSS}	Gate-Source Voltage	± 20		
T_J	Maximum Junction Temperature	175	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	135	A
Mounted on Large Heat Sink				
$I_{DP}^{①}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$	540	A
$I_D^{②}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ\text{C}$	135	A
		$T_C=100^\circ\text{C}$	95	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	395	W
		$T_C=100^\circ\text{C}$	197	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.38	$^\circ\text{C}/\text{W}$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient		62.5	$^\circ\text{C}/\text{W}$
Drain-Source Avalanche Ratings				
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed		625	mJ

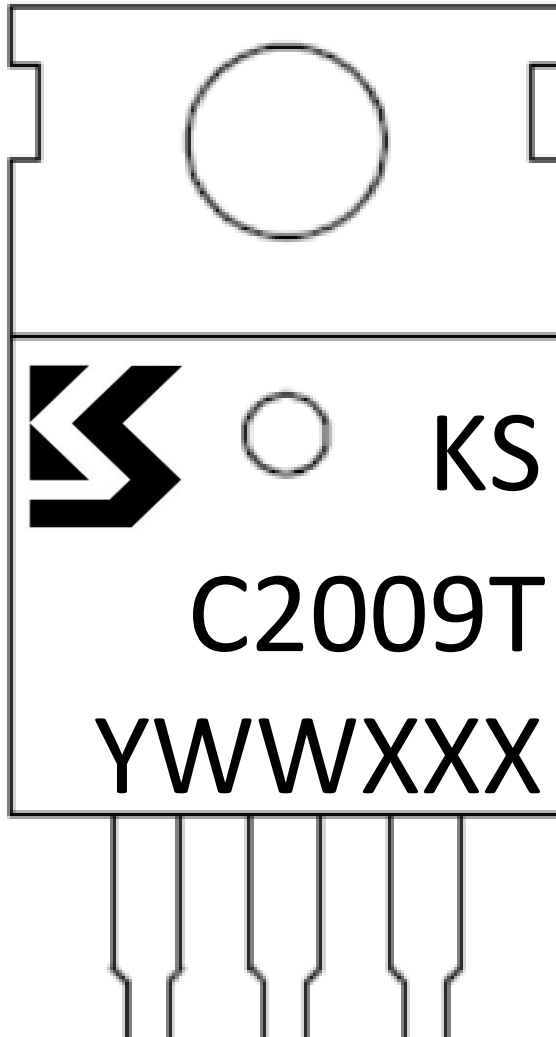
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KSC2009CAT			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	200			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=200V, V_{GS}=0V$			1	μA
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2.5	3.7	4.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		11	13	m Ω
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.84	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		127		ns
Q_{rr}	Reverse Recovery Charge			610		nC
Dynamic Characteristics⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		3		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=100V,$ Frequency=1.0MHz		6860		pF
C_{oss}	Output Capacitance			410		
C_{riss}	Reverse Transfer Capacitance			10		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=100V, I_{DS}=40A,$ $V_{GEN}=10V, R_G=3\Omega$		21		ns
t_r	Turn-on Rise Time			37		
$t_{d(OFF)}$	Turn-off Delay Time			60		
t_f	Turn-off Fall Time			13		
Gate Charge Characteristics⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=100V, V_{GS}=10V,$ $I_{DS}=40A$		75		nC
Q_{gs}	Gate-Source Charge			27		
Q_{gd}	Gate-Drain Charge			12		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by $T_{Jmax}, I_{AS}=50A, L=0.5mH, V_{DD}=48V, R_G=25\Omega$, Starting $T_J=25^\circ C$, 100% tested and guaranteed.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

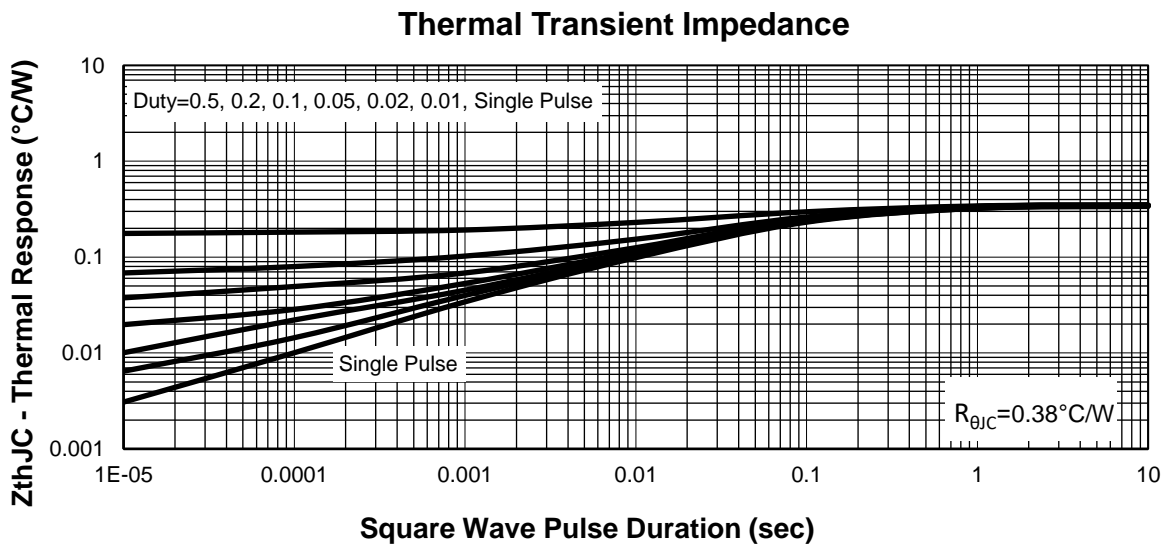
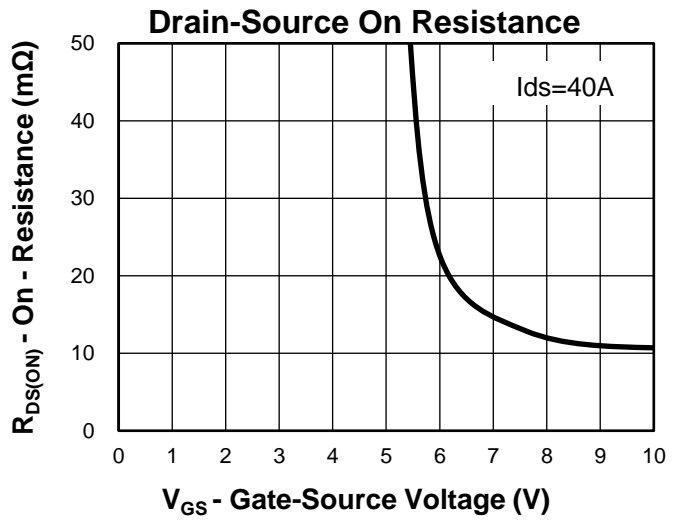
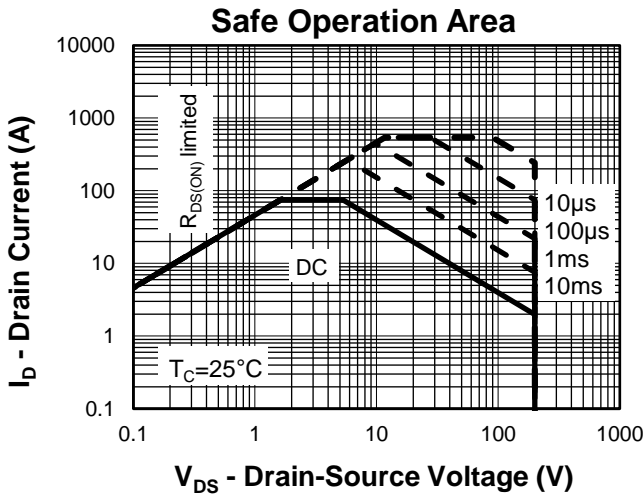
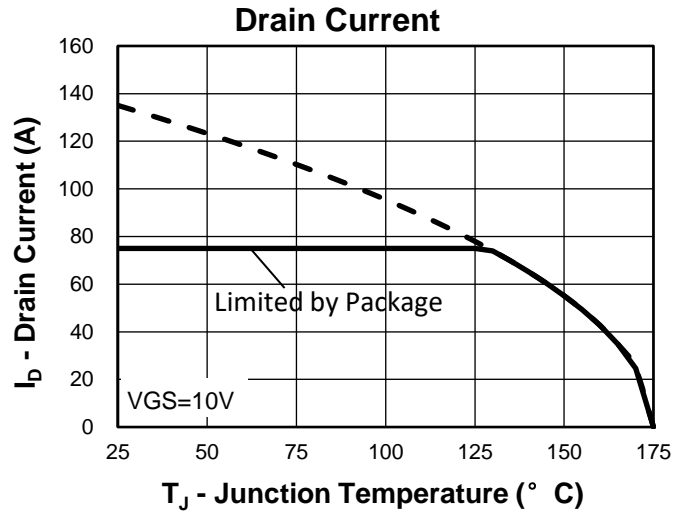
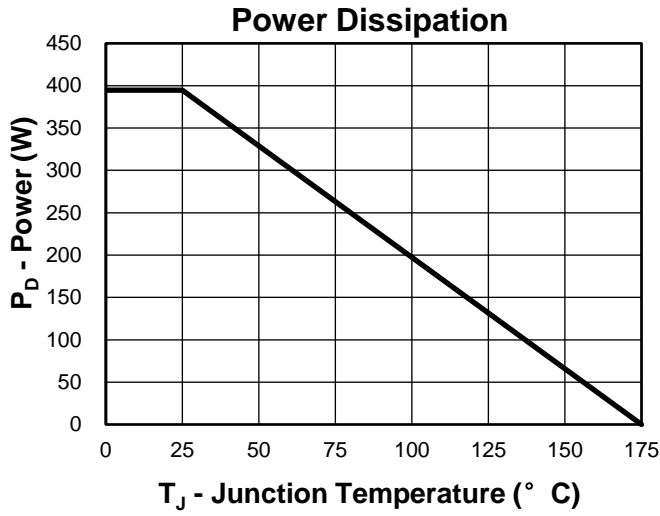
Ordering and Marking Information

Device	Package	Packaging	Quantity	Reel Size	Tape width
KSC2009CAT	TO-220	Tube	50	-	-

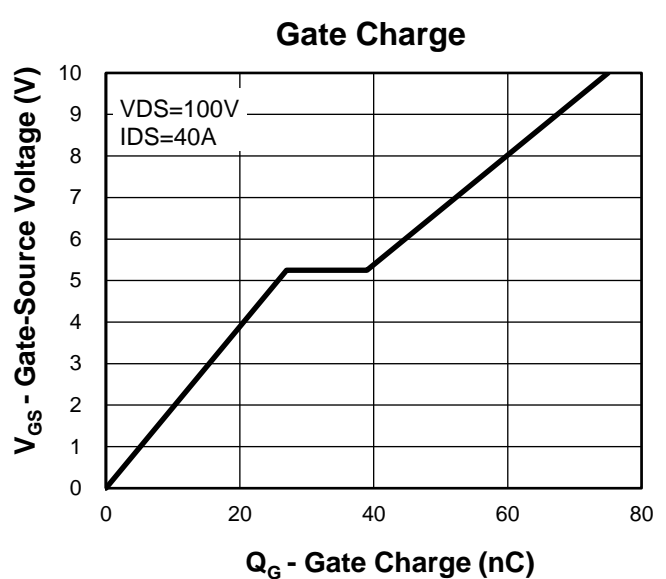
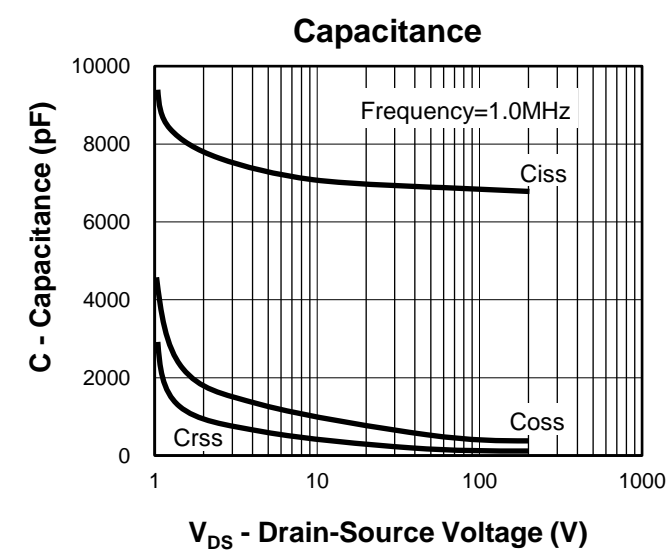
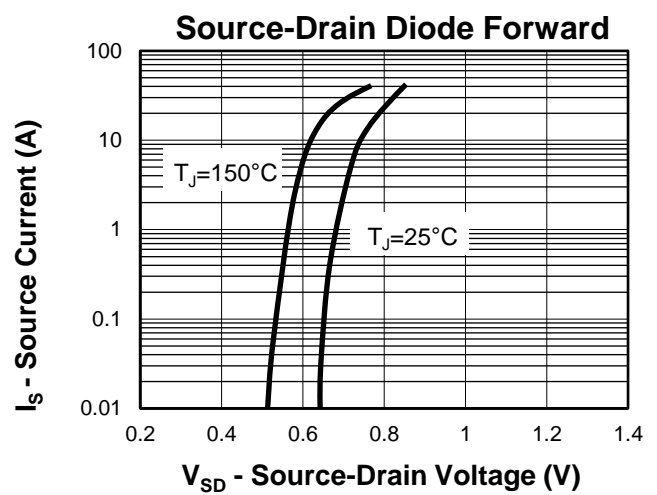
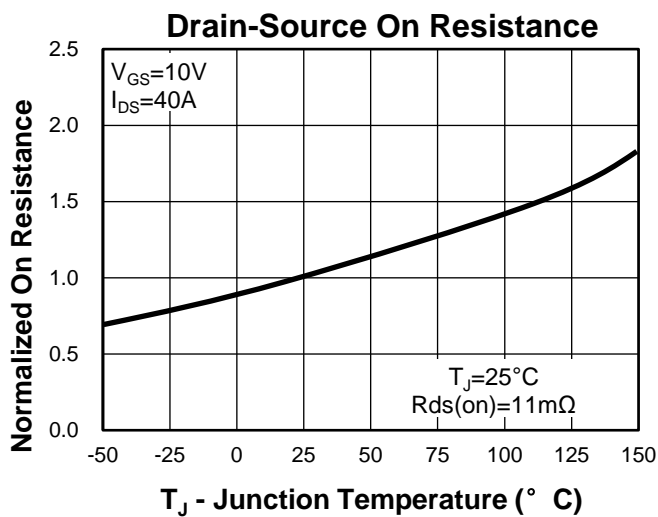
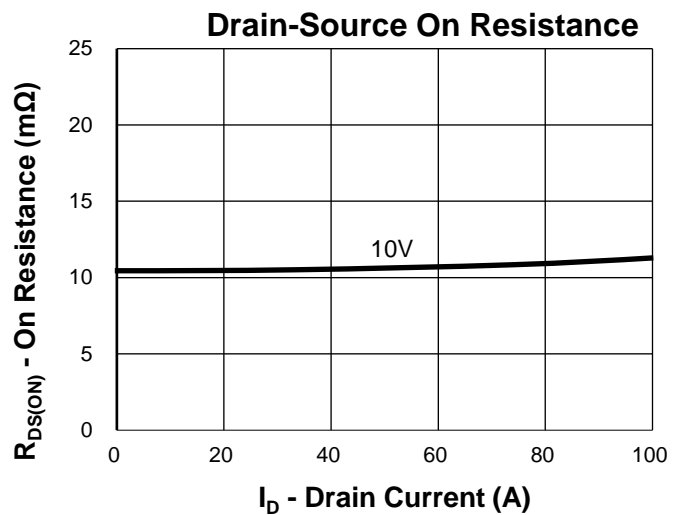
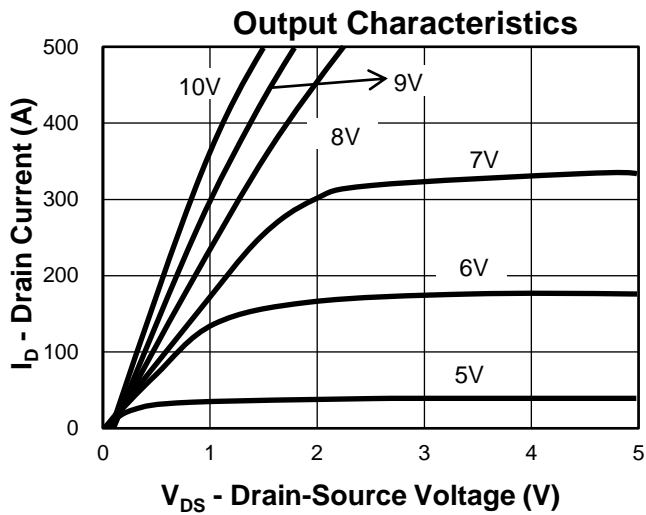


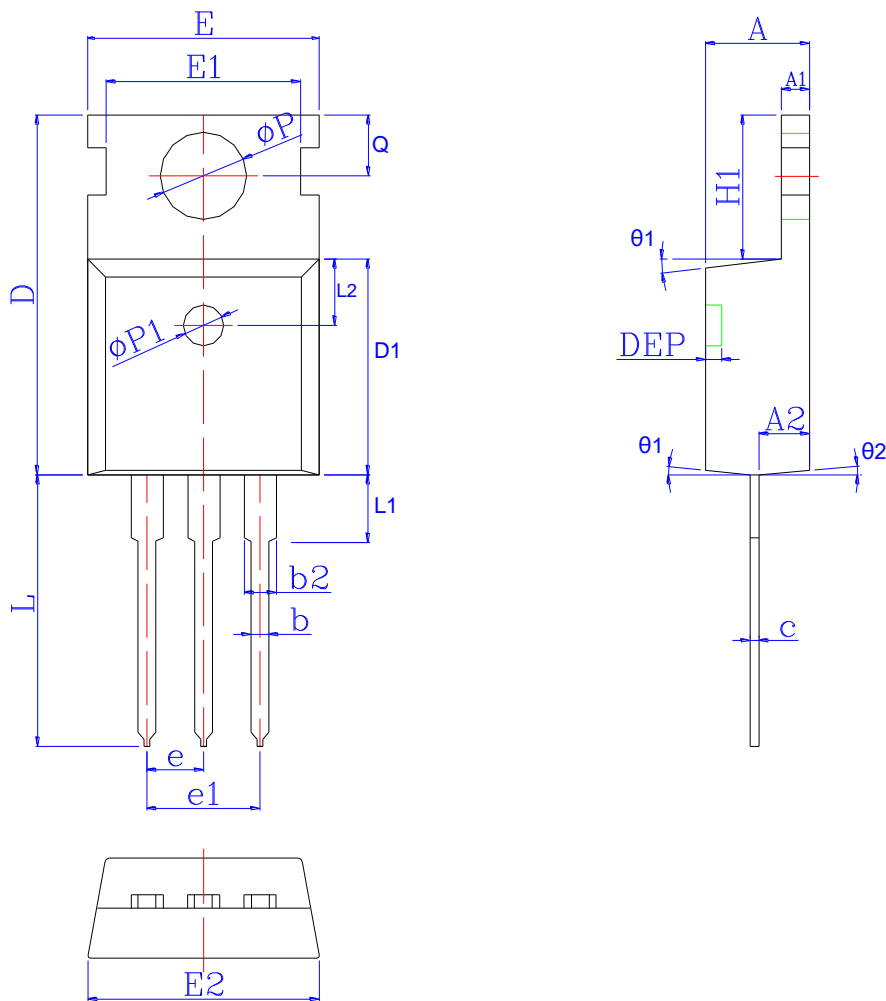
1st Line: Kwansemi LOGO, Kwansemi Code(KS)
2nd Line: Part Number(C2009T)
3rd Line: Lot Number(YWWXXX)

Typical Characteristics



Typical Characteristics



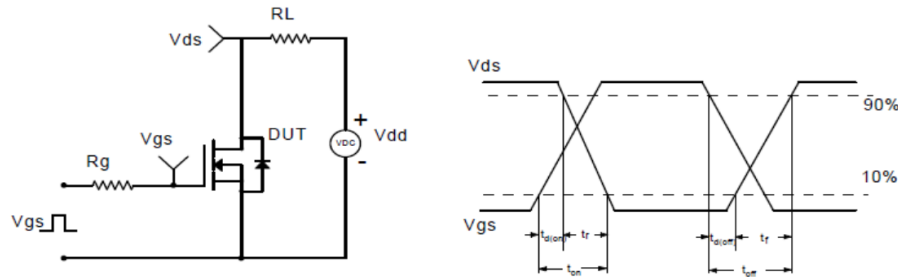
Package Information
TO-220


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.54	4.77	0.169	0.179	0.188	$\Phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.15	1.30	1.40	0.045	0.051	0.055	e	2.54 BSC			0.10 BSC		
A2	1.90	2.25	2.60	0.075	0.089	0.102	e1	5.08 BSC			0.20 BSC		
b	0.60	0.80	1.00	0.024	0.031	0.039	H1	6.30	6.50	6.80	0.248	0.256	0.268
b2	1.17	1.28	1.72	0.046	0.050	0.068	L	12.70	13.18	13.65	0.500	0.519	0.537
c	0.40	0.50	0.60	0.016	0.020	0.024	L1	*	*	3.95	*	*	0.156
D	15.40	15.70	16.00	0.606	0.618	0.630	L2	2.50 REF			0.098 REF		
D1	8.96	9.21	9.46	0.353	0.363	0.372	Φp	3.50	3.60	3.75	0.138	0.142	0.148
DEP	*	*	0.30	*	*	0.012	Q	2.70	2.80	3.20	0.106	0.110	0.126
E	9.66	9.97	10.28	0.380	0.393	0.405	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	*	8.70	*	*	0.343	*	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.402							

Avalanche Test Circuit and Waveforms



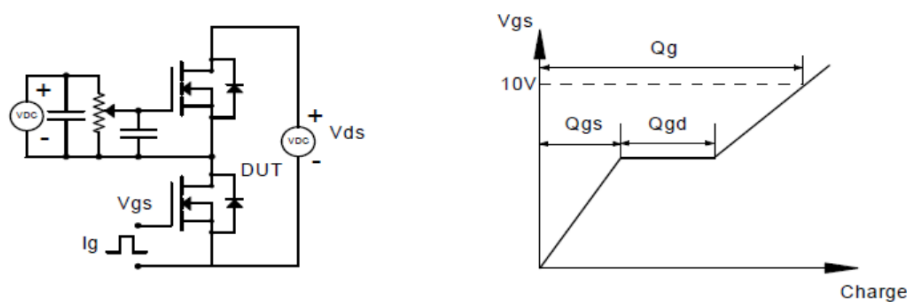
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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