

### Features

- 250V/83A,  
 $R_{DS(on)} = 18m\Omega(Typ.)@V_{GS}=10V$
- Excellent  $Q_G \times R_{DS(on)}$  product(FOM)
- SGT Technology
- 100% Avalanche Tested

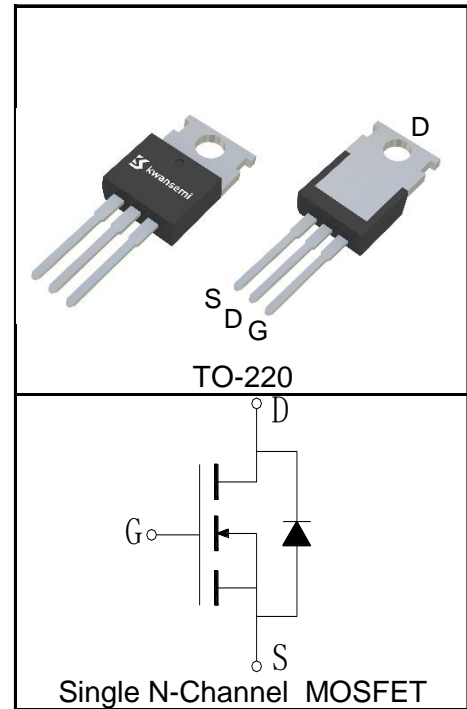
### Applications

- Uninterruptible Power Supply
- Inverter



Halogen-Free

### Pin Description



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
<b>Common Ratings</b> ( $T_C=25^\circ C$ Unless Otherwise Noted)			
$V_{DSS}$	Drain-Source Voltage	250	V
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	
$T_{Jmax}$	Maximum Junction Temperature	175	$^\circ C$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to 175	$^\circ C$
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ C$ 83	A
<b>Mounted on Large Heat Sink</b>			
$I_{DP}^{①}$	300 $\mu s$ Pulse Drain Current Tested	$T_C=25^\circ C$ 332	A
$I_D^{②}$	Continuous Drain Current( $V_{GS}=10V$ )	$T_C=25^\circ C$ 83	A
		$T_C=100^\circ C$ 59	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$ 416	W
		$T_C=100^\circ C$ 208	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.36	$^\circ C/W$
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ C/W$
<b>Drain-Source Avalanche Ratings</b>			
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	961	mJ

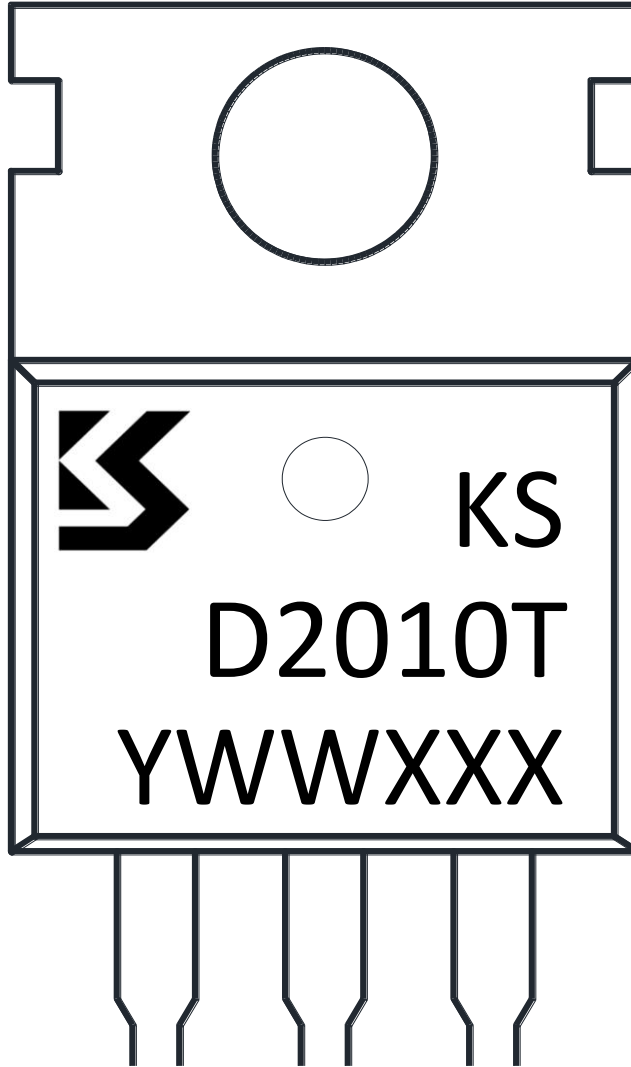
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KSD2010CAT			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	250			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=250V, V_{GS}=0V$			1	$\mu A$
		$T_J=125^\circ\text{C}$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2.5	3.5	4.5	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 30V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		18	22	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.79	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		55		ns
$Q_{rr}$	Reverse Recovery Charge			138		nC
<b>Dynamic Characteristics<sup>(6)</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		1.2		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=125V,$ Frequency=1.0MHz		10315		pF
$C_{oss}$	Output Capacitance			270		
$C_{rss}$	Reverse Transfer Capacitance			20		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=125V, I_{DS}=40A,$ $V_{GEN}=10V, R_G=3\Omega$		15		ns
$t_r$	Turn-on Rise Time			39		
$t_{d(OFF)}$	Turn-off Delay Time			54		
$t_f$	Turn-off Fall Time			28		
<b>Gate Charge Characteristics<sup>(6)</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=125V, V_{GS}=10V,$ $I_{DS}=40A$		139		nC
$Q_{gs}$	Gate-Source Charge			52		
$Q_{gd}$	Gate-Drain Charge			27		

- 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  $T_{Jmax}$ , Starting  $T_J = 25^\circ\text{C}$ ,  $I_{ASmax} = 62A$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = 48V$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10V$ . Part not recommended for use above this value. 100% Final Test at  $I_{AS} = 42A$ ,  $L = 0.5\text{mH}$ .
  - ⑤ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑥ Guaranteed by design, not subject to production testing.

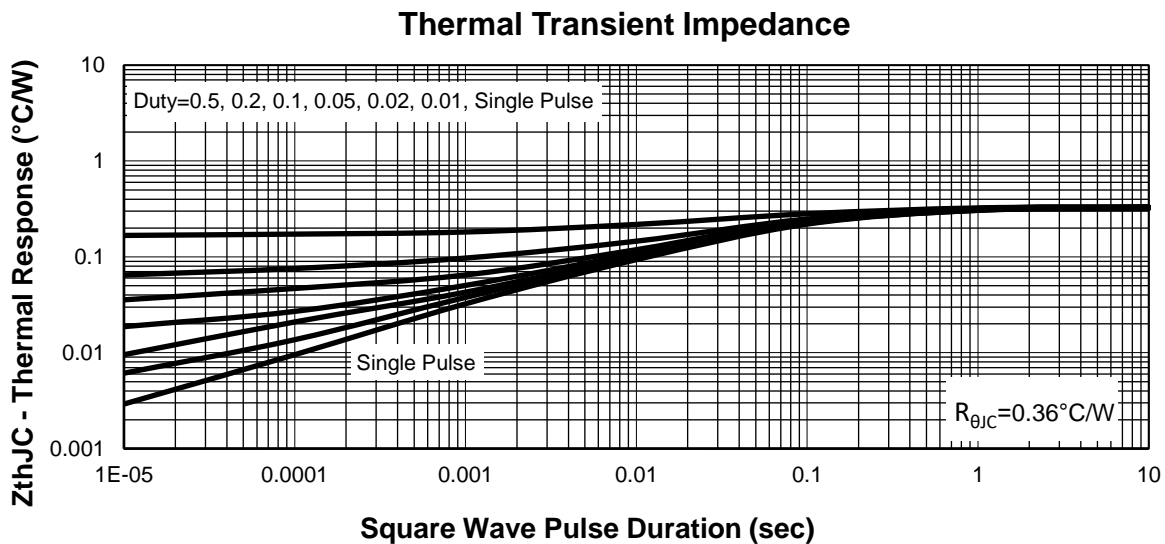
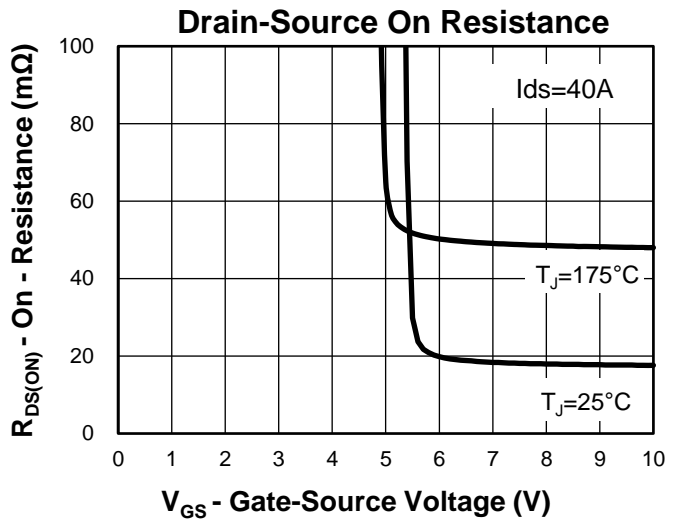
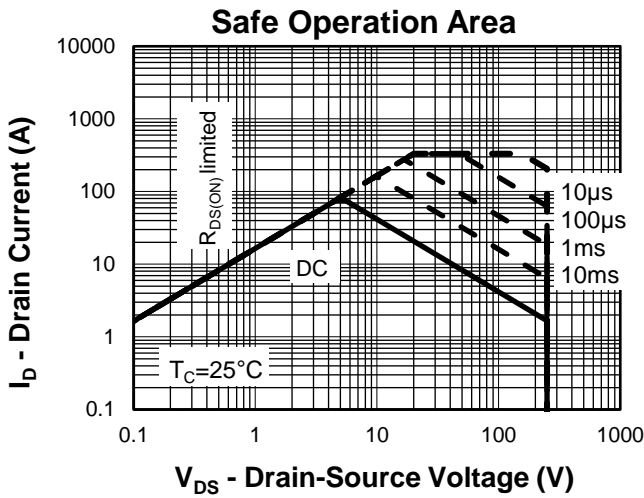
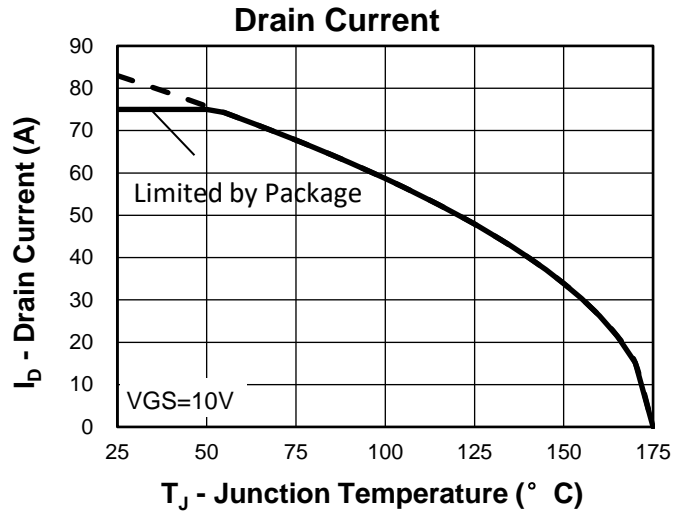
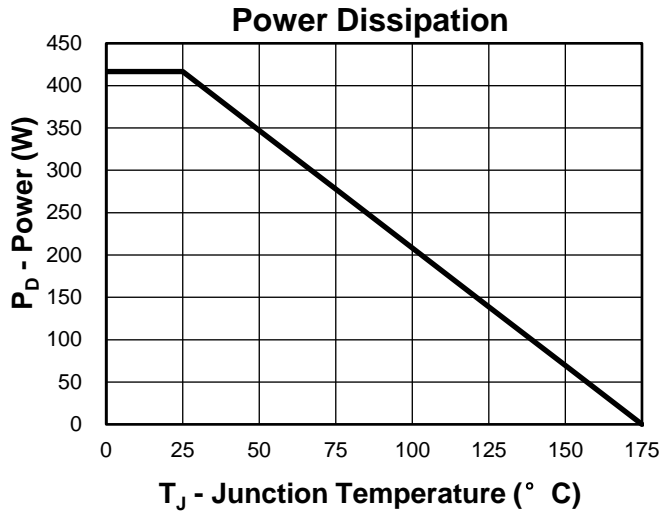
**Ordering and Marking Information**

Device	Package	Packaging	Quantity	Reel Size	Tape width
KSD2010CAT	TO-220	Tube	50	-	-

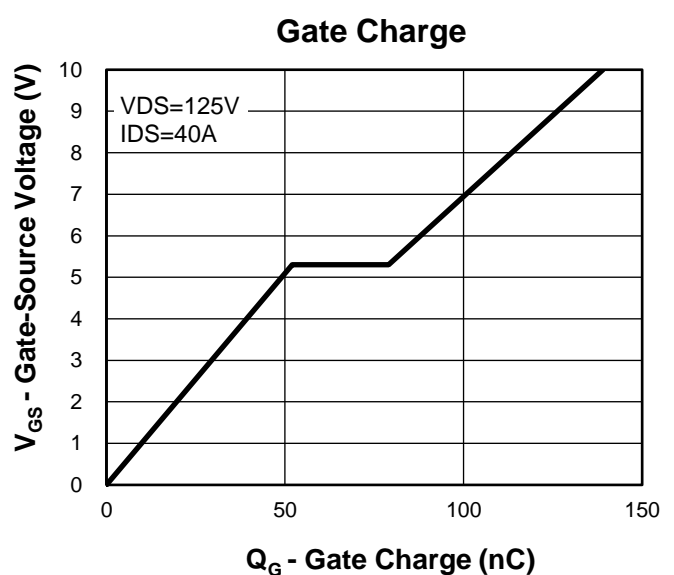
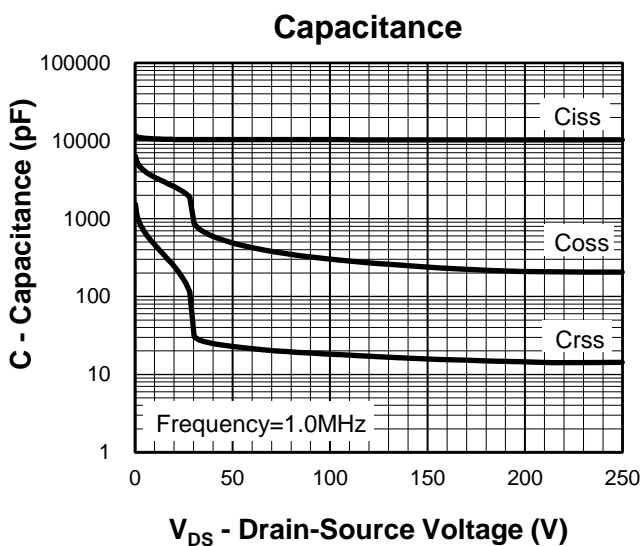
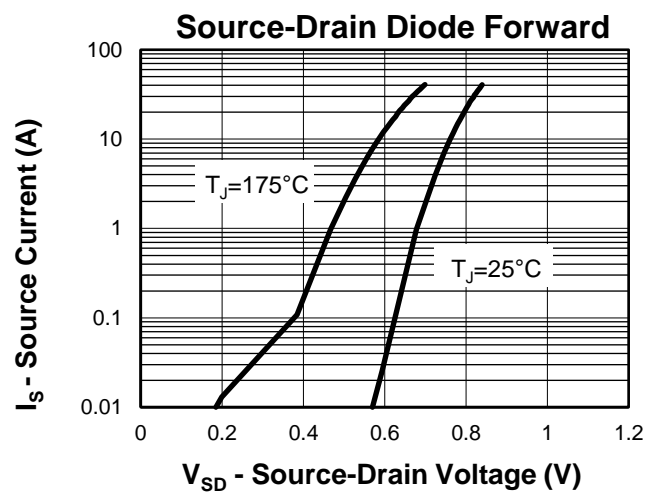
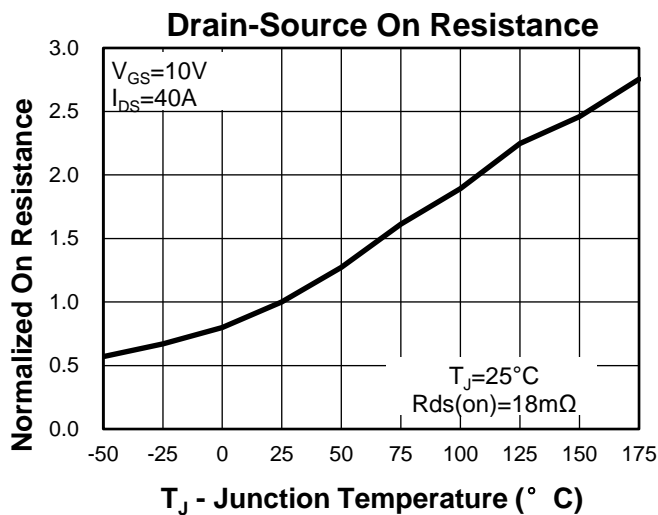
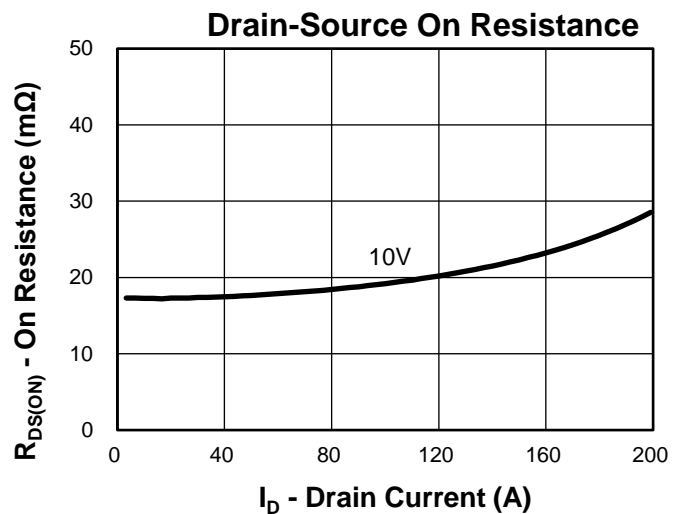
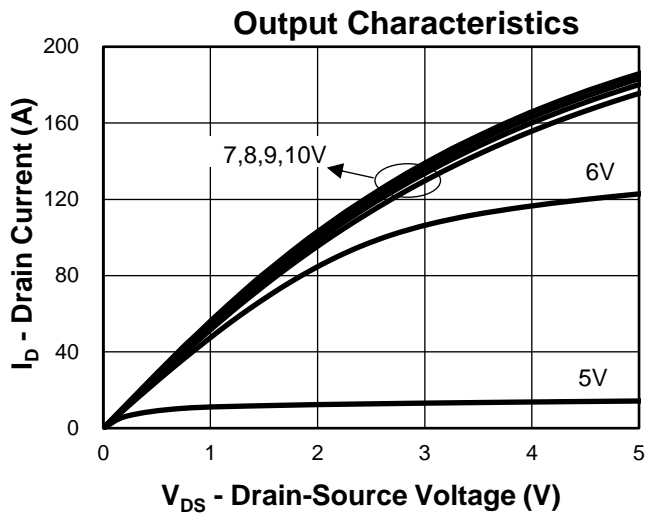


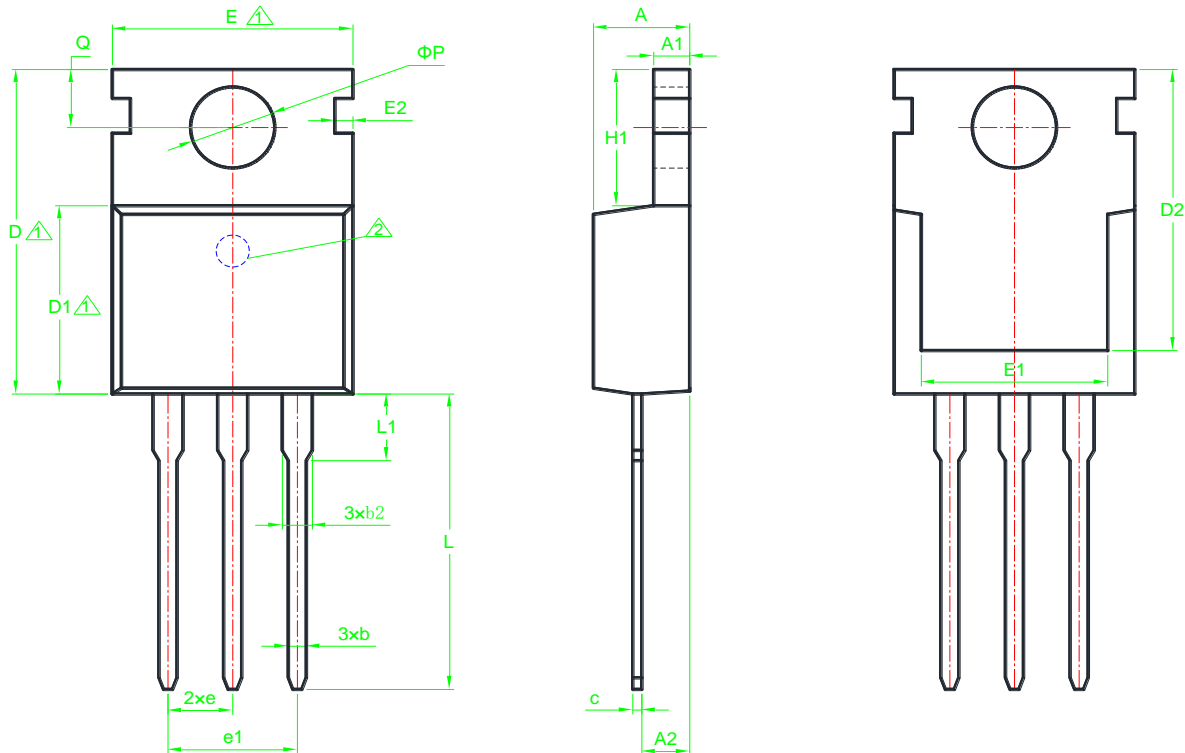
1st Line: Kwansemi LOGO, Kwansemi Code(KS)  
2nd Line: Part Number(D2010T)  
3rd Line: Lot Number(YWWXXX)

### 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	4.55	4.80	0.169	0.179	0.189	E1	7.00	*	8.40	0.276	*	0.331
A1	1.20	1.30	1.45	0.047	0.051	0.057	E2	*	*	0.75	*	*	0.030
A2	2.20	2.40	2.70	0.087	0.094	0.106	e	2.54BSC			0.100BSC		
b	0.70	0.80	0.95	0.028	0.031	0.037	e1	5.08BSC			0.200BSC		
b2	1.15	1.35	1.50	0.045	0.053	0.059	H1	6.30	6.50	6.80	0.248	0.256	0.268
c	0.40	0.50	0.60	0.016	0.020	0.024	L	12.70	13.20	13.90	0.500	0.520	0.547
D	15.10	15.60	16.10	0.594	0.614	0.634	L1	2.85	*	3.50	0.112	*	0.138
D1	8.75	9.20	9.65	0.344	0.362	0.380	ØP	3.50	3.65	3.80	0.138	0.144	0.150
D2	12.20	12.50	12.80	0.480	0.492	0.504	Q	2.70	*	2.90	0.106	*	0.114
E	9.70	10.00	10.30	0.382	0.394	0.406							

① Dimensions D and D1 and E do not include mold flash protrusions or gate burrs.

② The existence and size of demolding hole are variable depending on mold.

### 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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