

## Features

- 100V/131A,  
 $R_{DS(on)} = 4.1m\Omega(Typ.)@V_{GS}=10V$
- Excellent  $Q_G \times R_{DS(on)}$  product(FOM)
- SGT Technology
- 100% Avalanche Tested

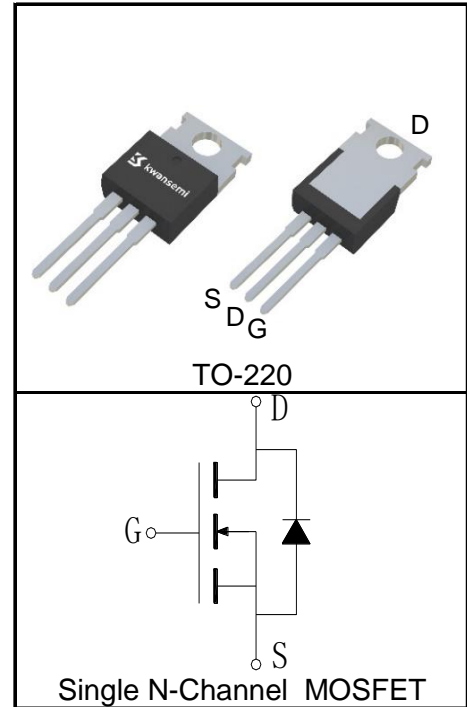
## Applications

- Battery Power Management
- Motor Control



Halogen-Free

## Pin Description



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings</b> ( $T_C=25^\circ\text{C}$ Unless Otherwise Noted)				
$V_{DSS}$	Drain-Source Voltage	100	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 20$		
$T_{Jmax}$	Maximum Junction Temperature	175	$^\circ\text{C}$	
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
$I_S$	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	131	A
<b>Mounted on Large Heat Sink</b>				
$I_{DP}^{①}$	Pulse Drain Current	$T_C=25^\circ\text{C}$	524	A
$I_D^{②}$	Continuous Drain Current( $V_{GS}=10V$ )	$T_C=25^\circ\text{C}$	131	A
		$T_C=100^\circ\text{C}$	92	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	176	W
		$T_C=100^\circ\text{C}$	88	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.85	$^\circ\text{C/W}$	
$R_{\theta JA}^{③}$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$	
<b>Drain-Source Avalanche Ratings</b>				
$E_{AS}^{④}$	Avalanche Energy, Single Pulsed	600	mJ	

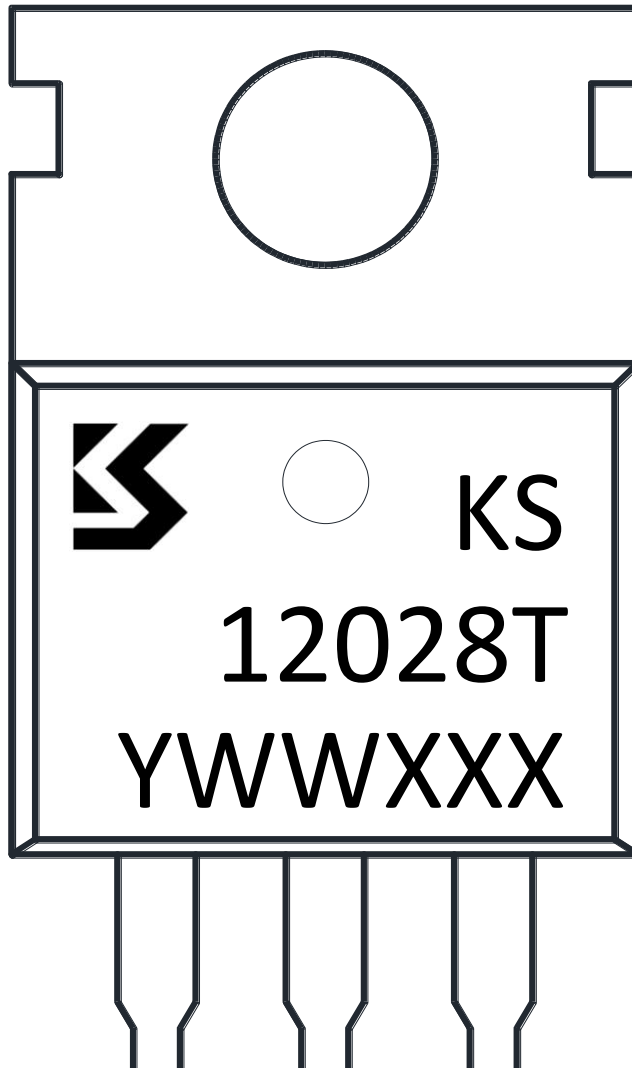
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS12028CAT			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	100			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$			1	$\mu A$
		$T_J=125^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		4.1	5	$m\Omega$
		$V_{GS}=6V, I_{DS}=20A$		5.7	7.5	$m\Omega$
<b>Diode Characteristics</b>						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.88	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		49		ns
$Q_{rr}$	Reverse Recovery Charge			98		nC
<b>Dynamic Characteristics<sup>(6)</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.5		$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=200KHz		4425		pF
$C_{oss}$	Output Capacitance			580		
$C_{rss}$	Reverse Transfer Capacitance			25		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=50V, I_{DS}=40A,$ $V_{GEN}=10V, R_G=3\Omega$		14		ns
$t_r$	Turn-on Rise Time			19		
$t_{d(OFF)}$	Turn-off Delay Time			38		
$t_f$	Turn-off Fall Time			17		
<b>Gate Charge Characteristics<sup>(6)</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V,$ $I_{DS}=40A$		65		nC
$Q_{gs}$	Gate-Source Charge			20		
$Q_{gd}$	Gate-Drain Charge			15		

- 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  $T_J = 25^\circ C$ ,  $I_{ASmax} = 49A$ ,  $L = 0.5mH$ ,  $V_{DD} = 48V$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10V$ . Part not recommended for use above this value. 100% Final Test at  $I_{AS} = 34A$ ,  $L = 0.5mH$ .
  - ⑤ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑥ Guaranteed by design, not subject to production testing.

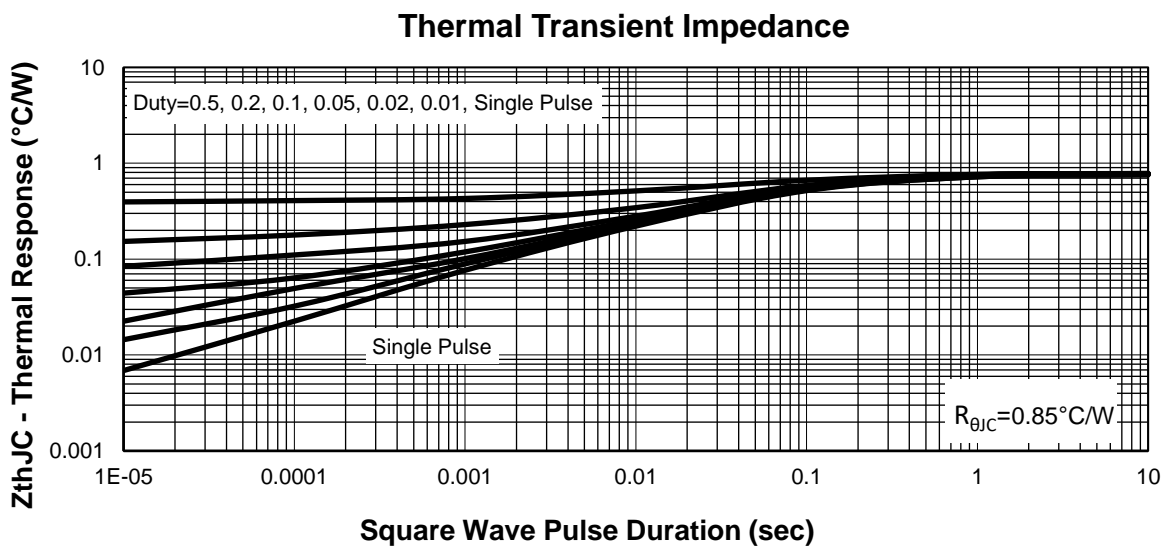
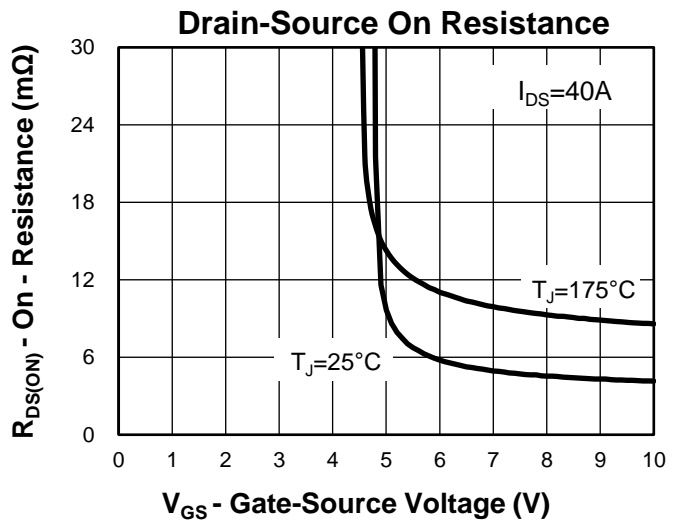
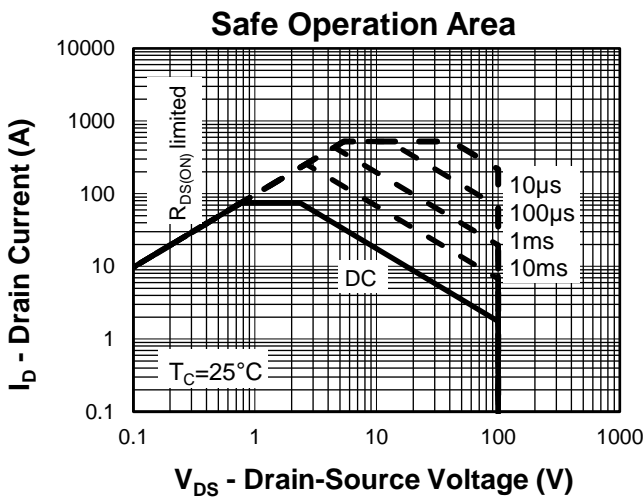
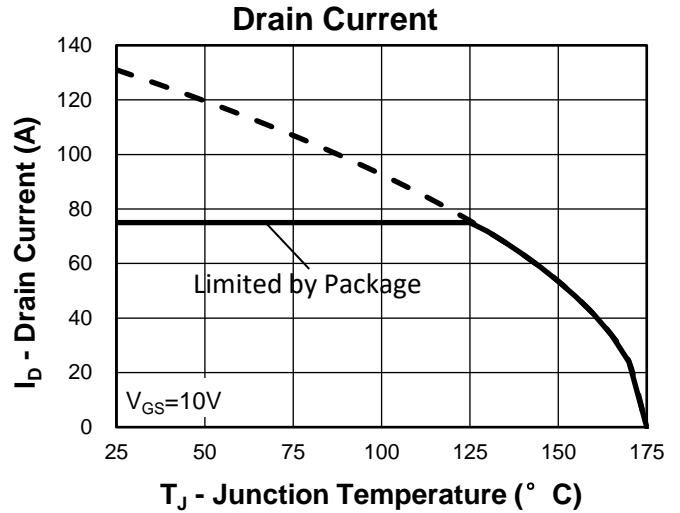
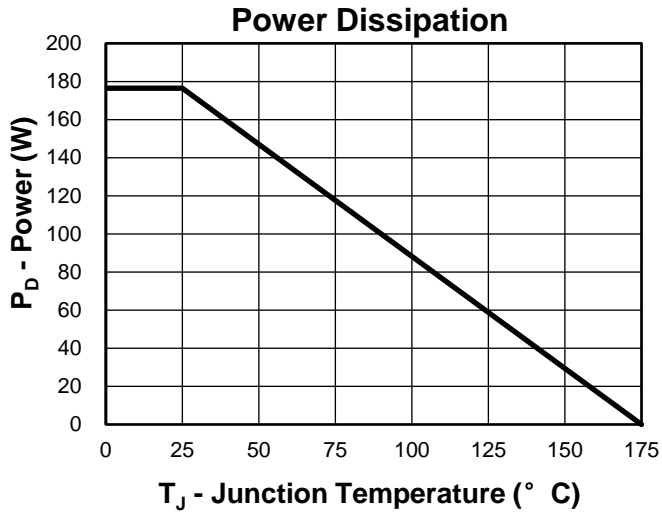
**Ordering and Marking Information**

Device	Package	Packaging	Quantity	Reel Size	Tape width
KS12028CAT	TO-220	Tube	50	-	-

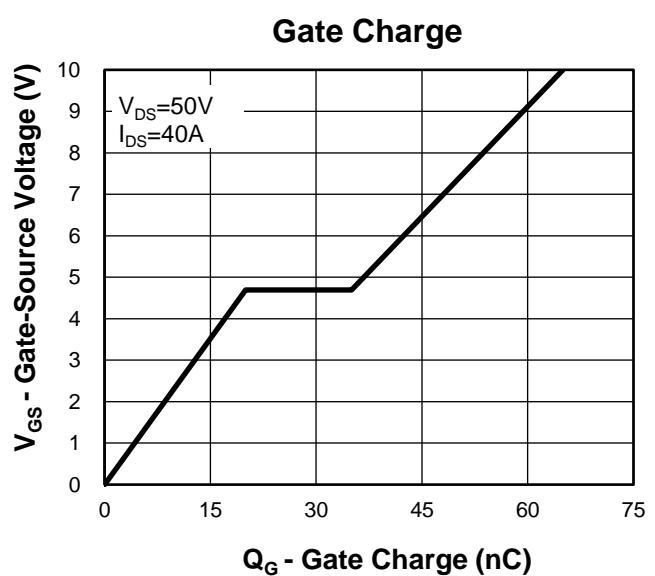
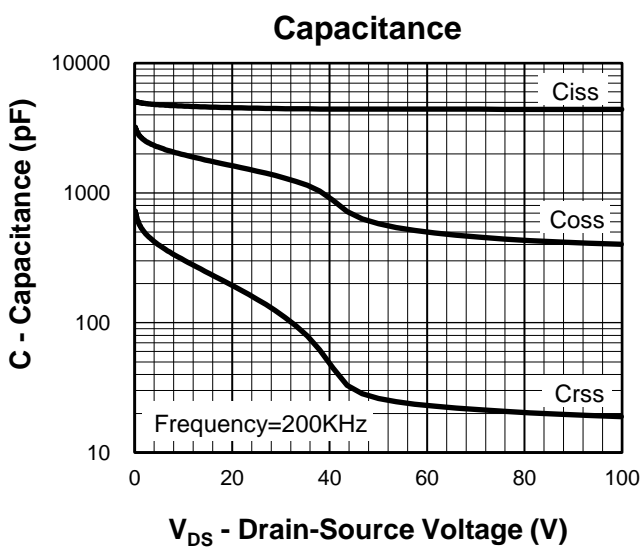
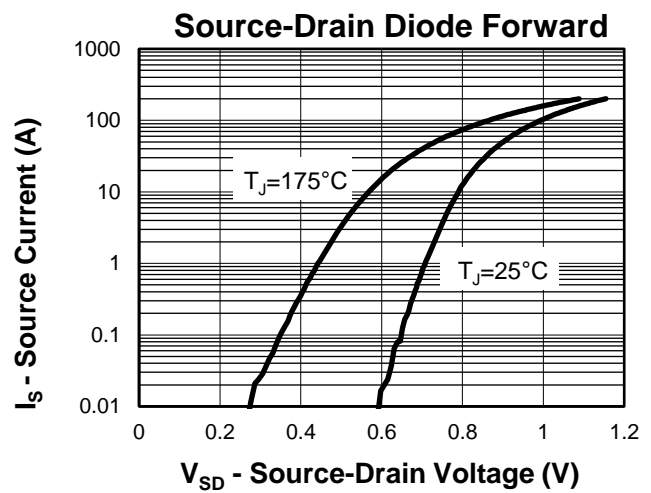
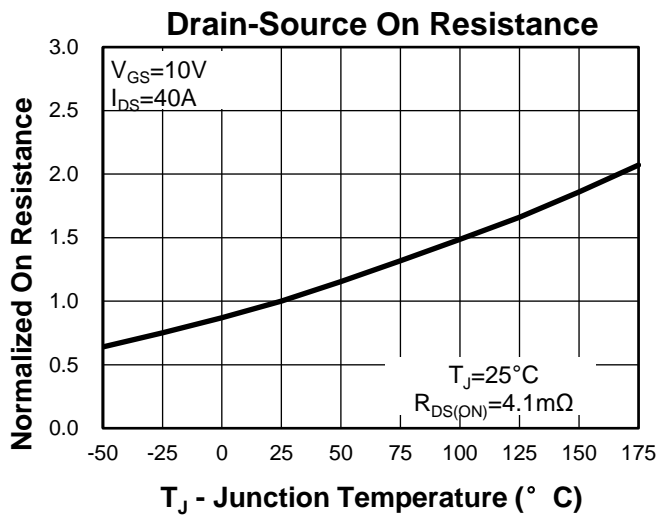
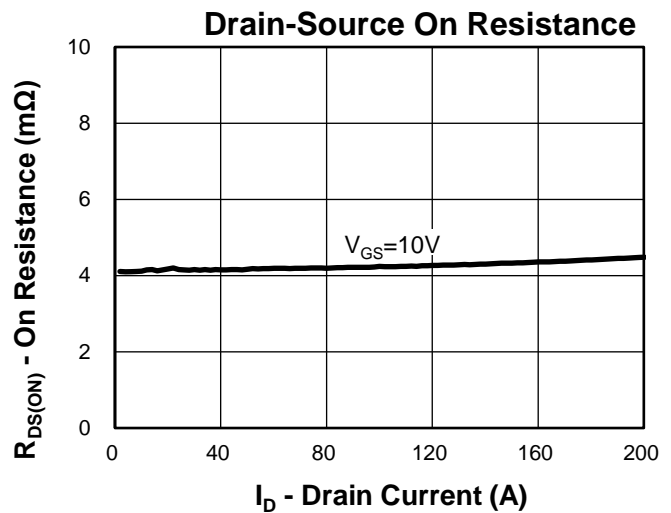
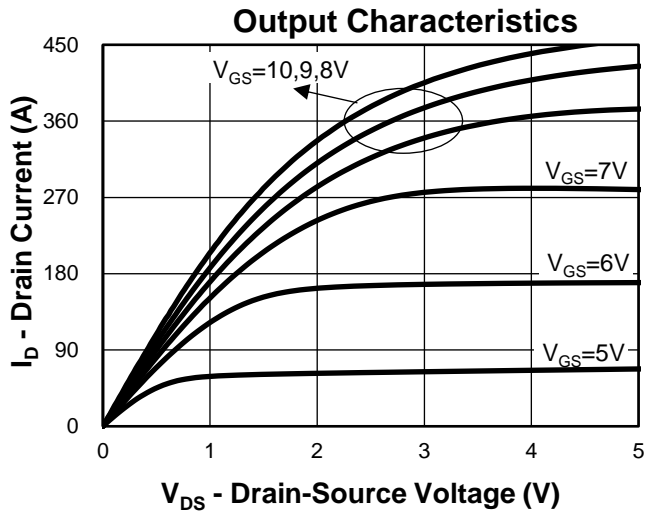


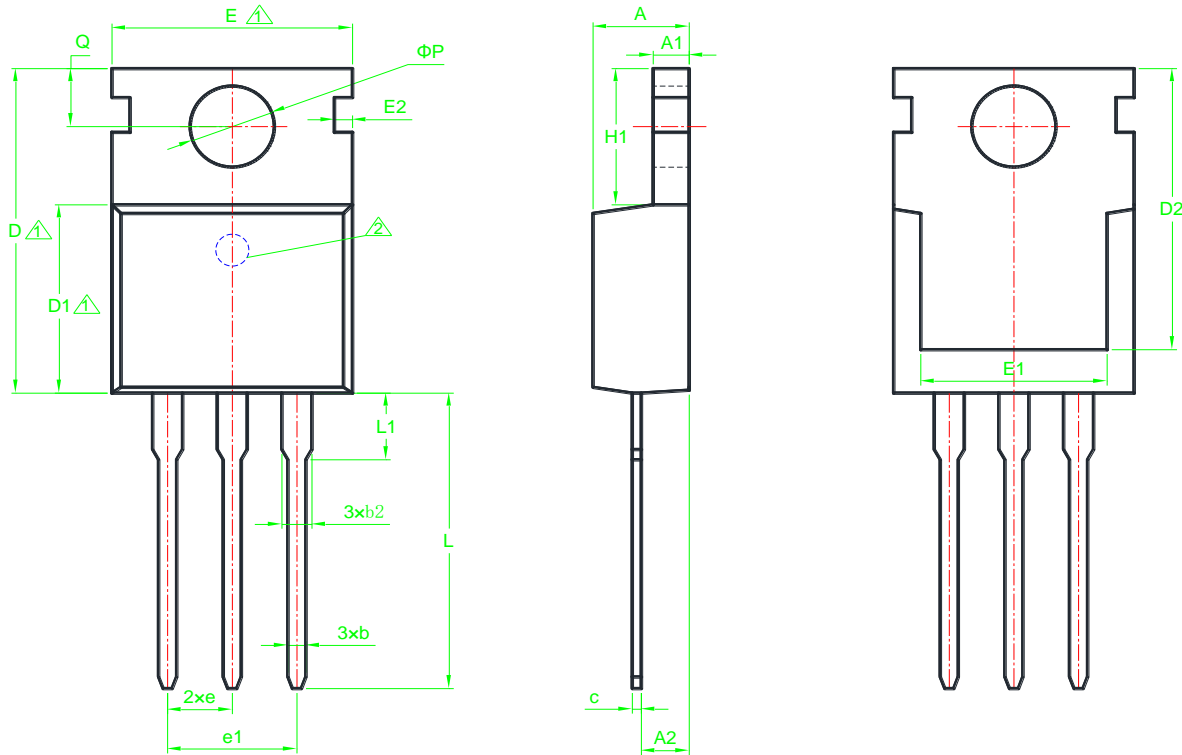
- 1st Line: Kwansemi LOGO, Kwansemi Code(KS)
- 2nd Line: Part Number(12028T)
- 3rd Line: Lot Number(YWWXXX)

### 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

Kwansemi Semiconductor Co.,Ltd

Email:Sales@kwansemi.com

Web:www.kwansemi.com

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