

Features

- 100V/290A,
 $R_{DS(on)} = 2.3m\Omega(Typ.)@V_{GS}=10V$
- Excellent $Q_G \times R_{DS(on)}$ product(FOM)
- SGT Technology
- High Ruggedness
- 100% Avalanche Tested

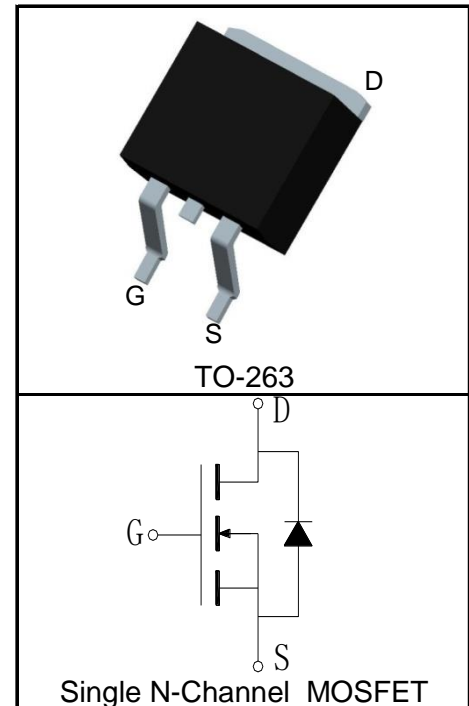
Applications

- Motor Control
- Battery Power Management



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	100	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	$T_C=25^\circ\text{C}$ 290	A
Mounted on Large Heat Sink			
$I_{DP}^{(1)}$	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 1160	A
$I_D^{(2)}$	Continuous Drain Current($V_{GS}=10V$)	$T_C=25^\circ\text{C}$ 290	A
		$T_C=100^\circ\text{C}$ 205	
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

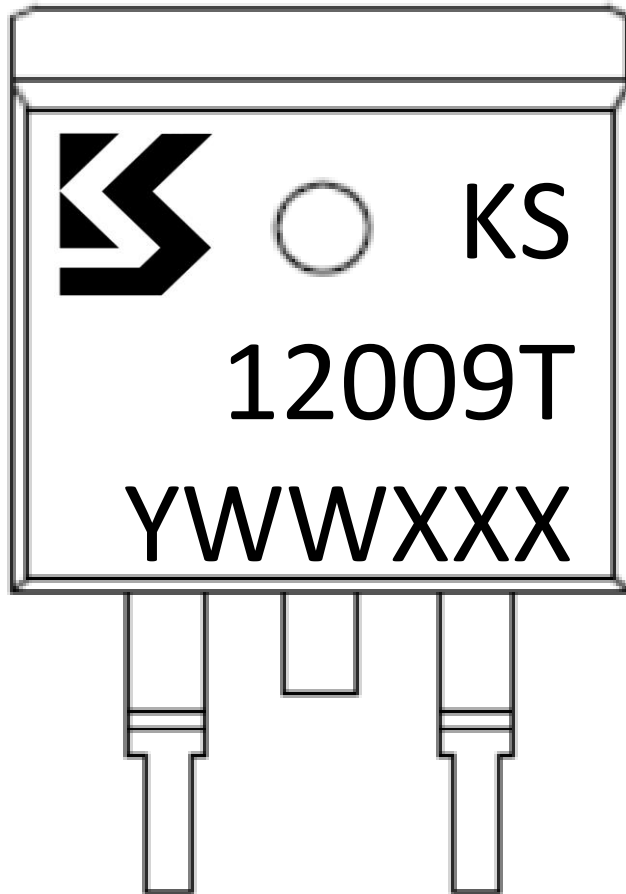
Electrical Characteristics ($T_C=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	KS12009GAT			Unit
			Min.	Typ.	Max.	
Static Characteristics						
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	μA
		$T_J=125^\circ C$			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	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(5)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=40A$		2.3	2.8	m Ω
Diode Characteristics						
$V_{SD}^{(5)}$	Diode Forward Voltage	$I_{SD}=40A, V_{GS}=0V$		0.8	1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=40A, dI_{SD}/dt=100A/\mu s$		80		ns
Q_{rr}	Reverse Recovery Charge			177		nC
Dynamic Characteristics⁽⁶⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.9		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=50V,$ Frequency=1.0MHz		12210		pF
C_{oss}	Output Capacitance			2100		
C_{riss}	Reverse Transfer Capacitance			135		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=50V, I_{DS}=40A,$ $V_{GEN}=10V, R_G=3\Omega$		32		ns
t_r	Turn-on Rise Time			44		
$t_{d(OFF)}$	Turn-off Delay Time			118		
t_f	Turn-off Fall Time			53		
Gate Charge Characteristics⁽⁶⁾						
Q_g	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V,$ $I_{DS}=40A$		172		nC
Q_{gs}	Gate-Source Charge			48		
Q_{gd}	Gate-Drain Charge			39		

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - 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
KS12009GAT	TO-263	Tape&Reel	800	13"	24mm

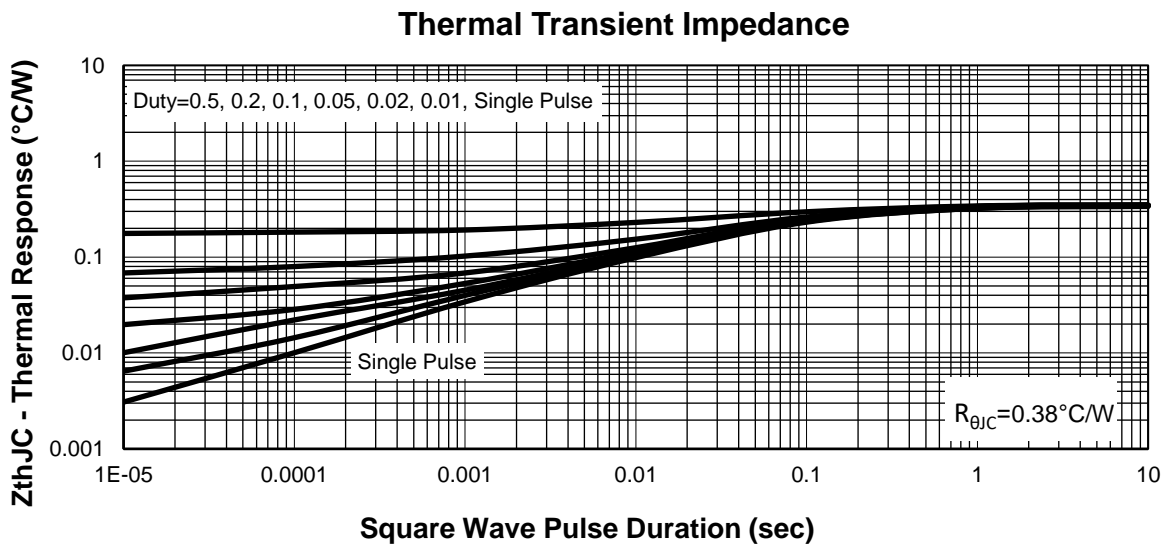
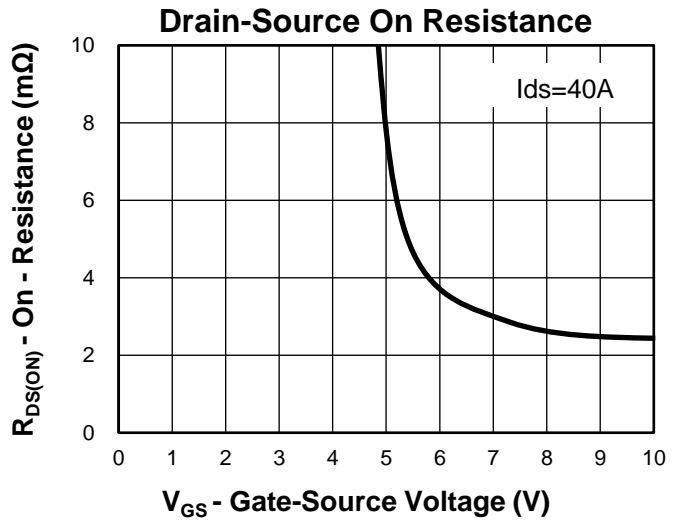
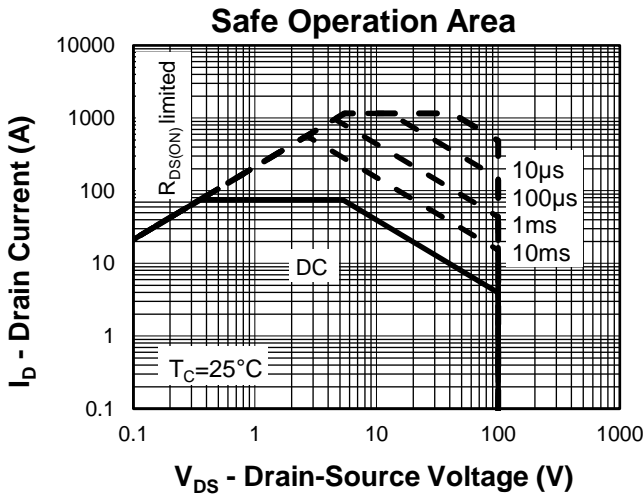
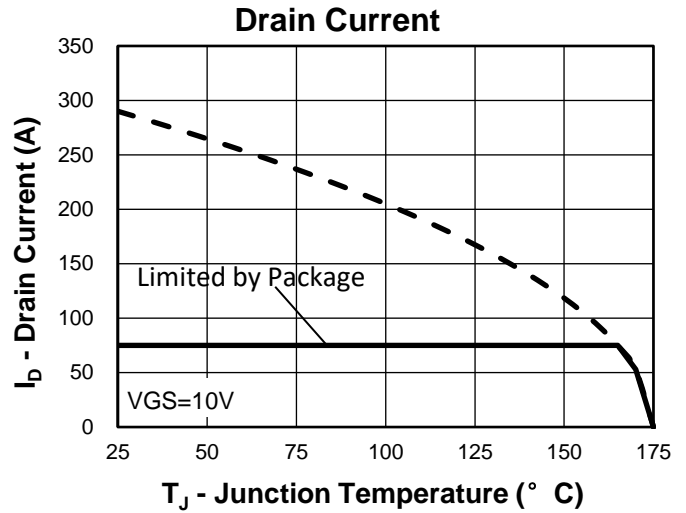
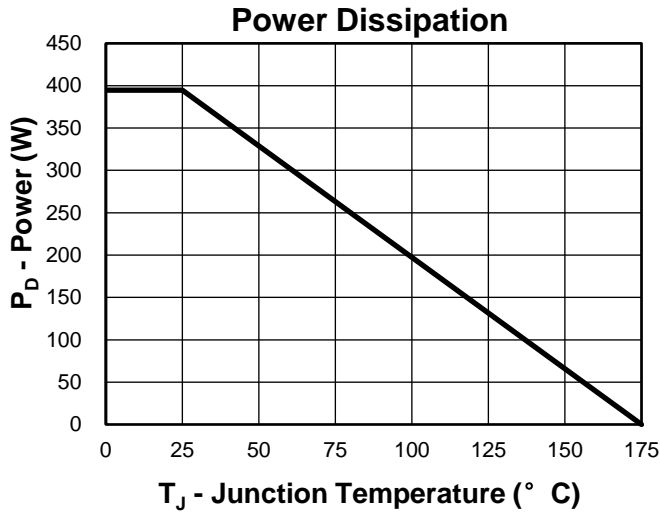


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

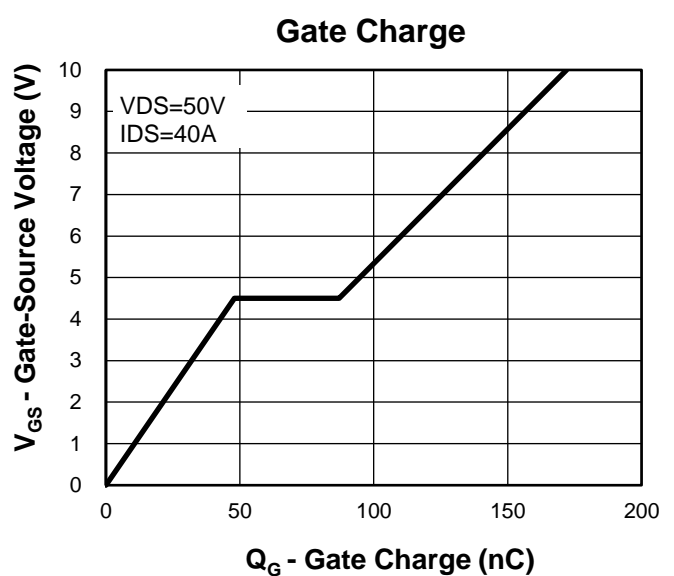
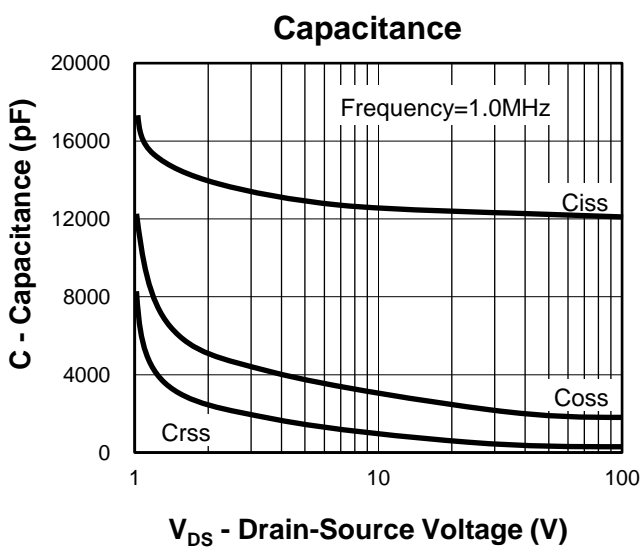
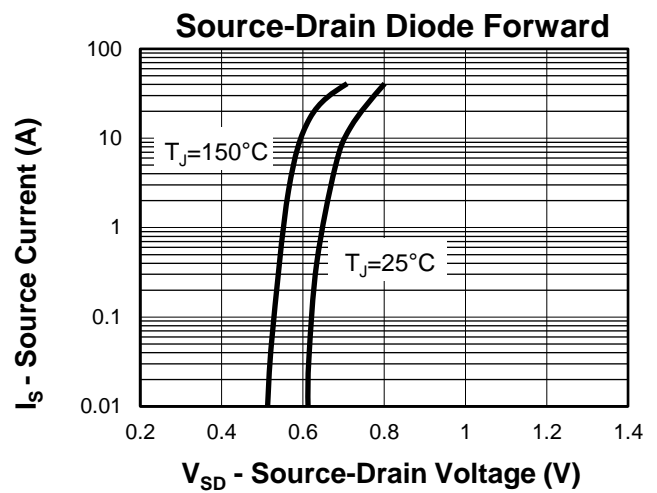
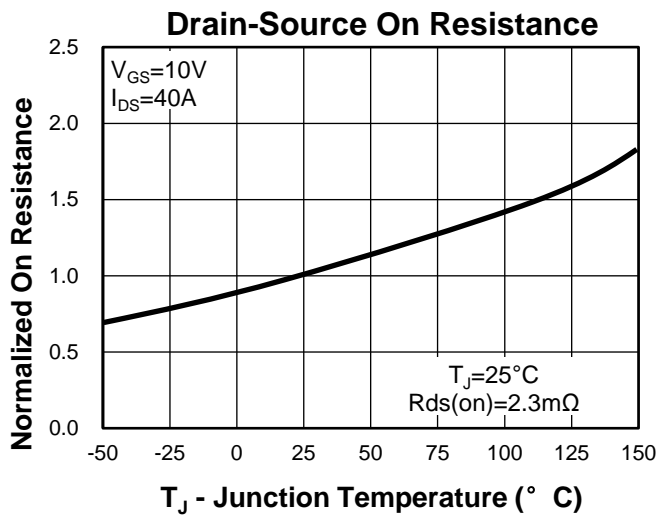
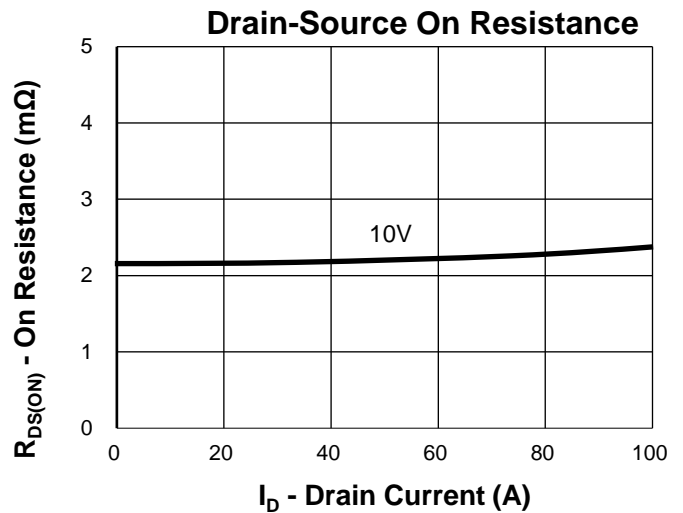
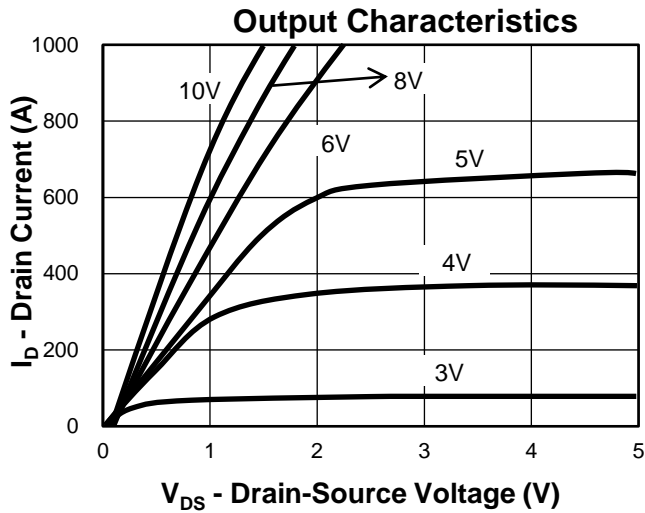
2nd Line: Part Number(12009T)

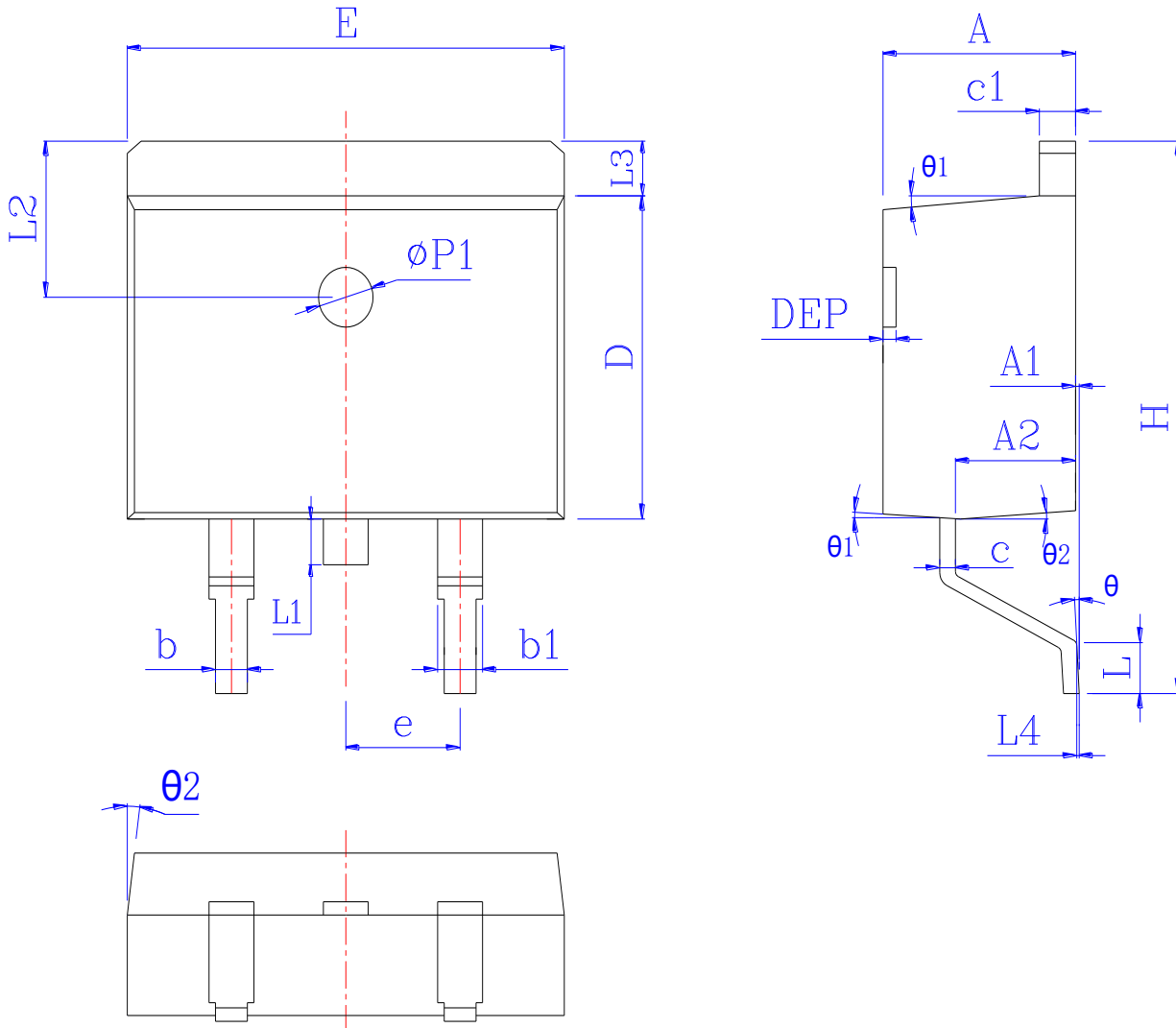
3rd Line: Lot Number(YWWXXX)

Typical Characteristics



Typical Characteristics



Package Information
TO-263


SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.55	4.72	0.173	0.179	0.186	L	1.94	2.30	2.60	0.076	0.091	0.102
A1	0.00	0.10	0.25	0.000	0.005	0.010	L3	1.17	1.29	1.40	0.046	0.051	0.055
A2	2.59	2.69	2.79	0.102	0.106	0.110	L1	*	*	1.70	*	*	0.067
b	0.76	*	0.90	0.030	*	0.035	L4	0.25 BSC			0.01 BSC		
b1	1.22	*	1.36	0.048	*	0.054	L2	2.50 REF			0.098 REF		
c	0.33	*	0.47	0.013	*	0.019	θ	0°	*	8°	0°	*	8°
c1	1.22	*	1.32	0.048	*	0.052	$\theta1$	5°	7°	9°	5°	7°	9°
D	8.60	*	9.29	0.339	*	0.366	$\theta2$	1°	3°	5°	1°	3°	5°
E	9.95	*	10.26	0.392	*	0.404	DEP	0.05	0.10	0.20	0.002	0.004	0.008
e	2.54BSC			0.100BSC			$\Phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
H	14.70	15.10	15.79	0.579	0.594	0.622							

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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