

Silicon Carbide MOSFET

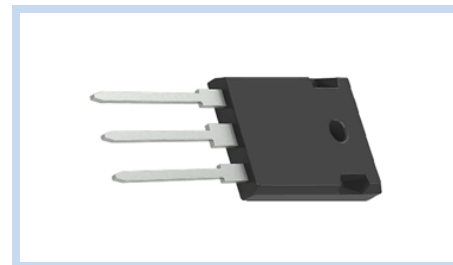
N-Channel 650V 92A TO-247

MFTC65N92T247

MERITEK

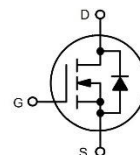
FEATURE

- $R_{DS(ON)} < 48m\Omega$ at $V_{GS}=18V$, $I_D=50A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery
- Applications: High Voltage DC/DC Converters, Switching Mode Power Supplier, Renewable Energy, EV Motor Drives



MECHANICAL DATA

- Case: TO-247 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



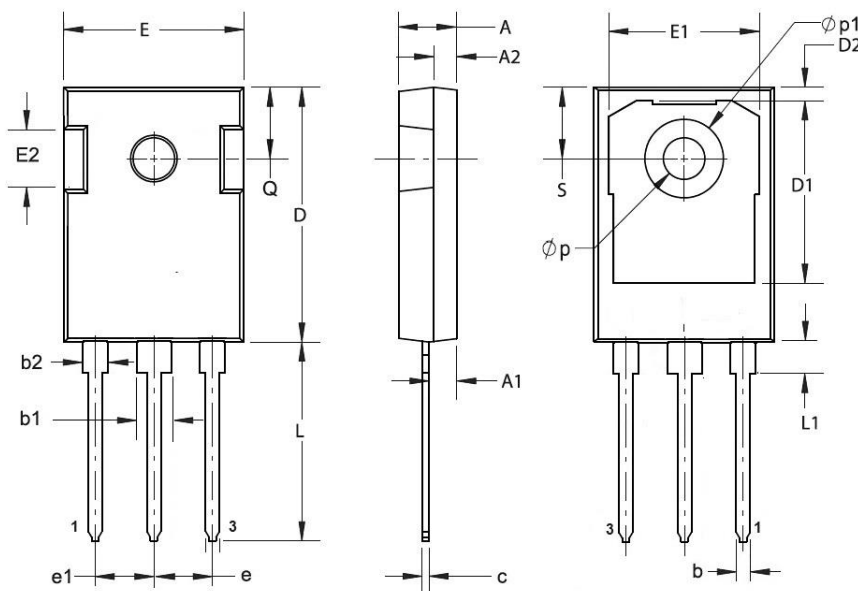
MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	650	V
Gate-Source Voltage	Absolute Maximum Value	V_{GS}	-8/+22	V
	Recommended Operational Values		-4/+18	
Drain Current – Continuous	$V_{GS}=18V$, $T_C=25^\circ C$	I_D	92	A
	$V_{GS}=18V$, $T_C=100^\circ C$		64	
Power Dissipation		P_D	312	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.48	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

DIMENSION	Min	Max
A	4.80	5.20
A1	2.80	3.20
A2	2.26	2.56
b	1.10	1.30
b1	2.90	3.20
b2	2.00	2.20
c	0.50	0.70
D	20.80	21.20
e	5.34	5.54
e1	10.68	11.08
E	15.60	16.00
L	19.72	20.12
L1	15.79 BSC	
p	3.50	3.70
Q	6.00	6.30

Note: Pin Layout: 1:Gate(G), 2:Drain(D), 3:Source(S)



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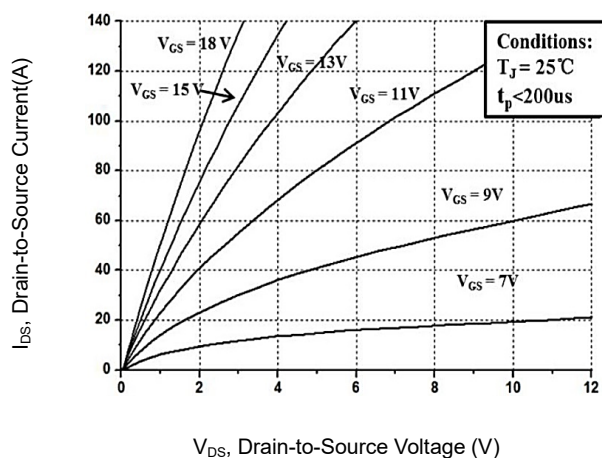
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ELECTRICAL CHARACTERISTICS

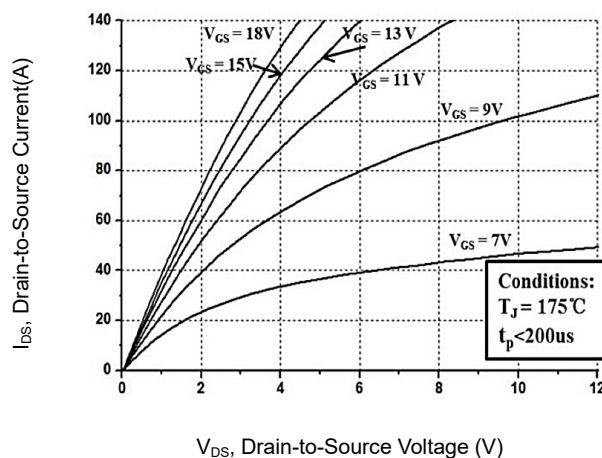
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	650	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$	I_{DSS}	--	1	100	μA
Gate-Body Leakage Current, Forward	$V_{GS}=22V, V_{DS}=0V$	I_{GSSF}	--	10	250	nA
Gate-Body Leakage Current, Reverse	$V_{GS}=-8V, V_{DS}=0V$	I_{GSSR}	--	10	250	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=18V, I_D=50A$	$R_{DS(ON)}$	--	20	30	m Ω
	$V_{GS}=18V, I_D=50A, T_J=175^\circ C$		--	28	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=15mA$	$V_{GS(th)}$	1.9	2.6	4.0	V
	$V_{GS}=V_{DS}, I_D=15mA, T_J=175^\circ C$		--	1.8	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=400V, I_D=40A, V_{GS}= -4/+18V$	Q_g	--	187	--	nC
Gate-Source Charge		Q_{gs}	--	49	--	
Gate-Drain Charge		Q_{gd}	--	31	--	
Turn-On Delay Time	$V_{DS}=400V, I_D=40A, L=100\mu H$ $V_{GS}= -4/+18V, R_{GEN}=2.5\Omega$	$T_{d(on)}$	--	17	--	nS
Rise Time		T_r	--	15	--	
Turn-Off Delay Time		$T_{d(off)}$	--	65	--	
Fall Time		T_f	--	14	--	
Turn-On Switching Loss		E_{ON}	--	0.52	--	mJ
Turn-Off Switching Loss		E_{OFF}	--	0.7	--	
Input Capacitance	$V_{DS}=600V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	C_{iss}	--	3180	--	pF
Output Capacitance		C_{oss}	--	281	--	
Reverse Transfer Capacitance		C_{rss}	--	33	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	$V_{GS}= -4V, T_C=25^\circ C$	I_S	--	--	92	A
Drain-Source Diode Forward Voltage	$V_{GS}= -4V, I_{SD}=20A$	V_{SD}	--	4.2	--	V
	$V_{GS}= -4V, I_{SD}=20A, T_J=175^\circ C$		--	3.9	--	
Peak Reverse Recovery Current	$V_{GS}= -4V, V_R=800V, I_{SD}=40A$, $dif/dt=3800A/\mu s$	I_{rm}	--	3.4	--	A
Reverse Recovery Time		T_{rr}	--	26	--	nS
Reverse Recovery Charge		Q_{rr}	--	58	--	nC

CHARACTERISTIC CURVES

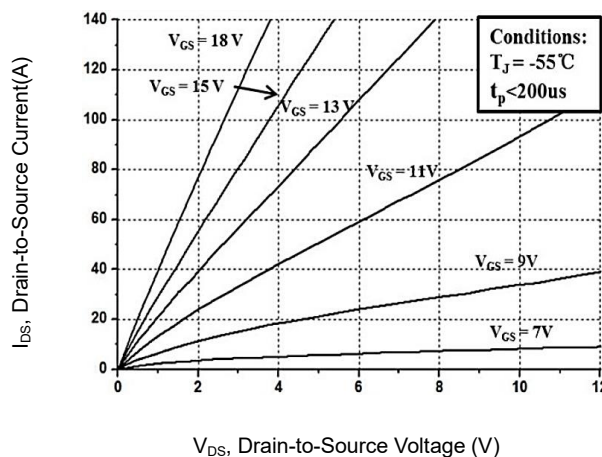
Output Characteristics



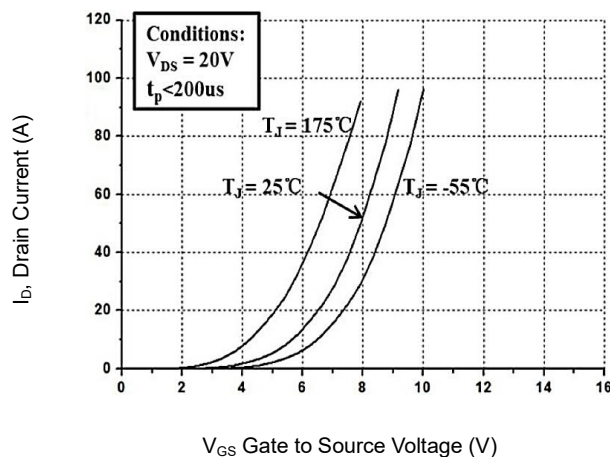
Output Characteristics



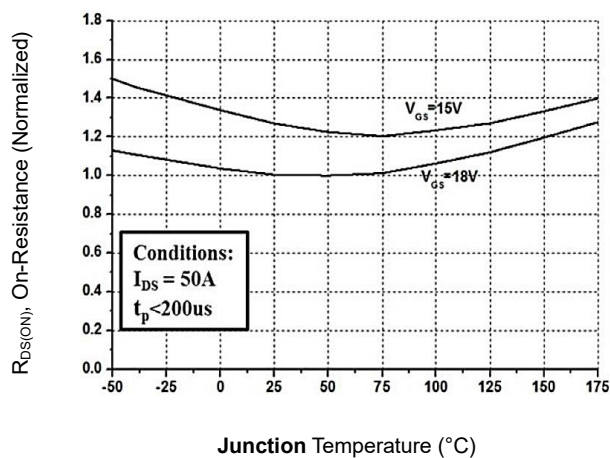
Output Characteristics



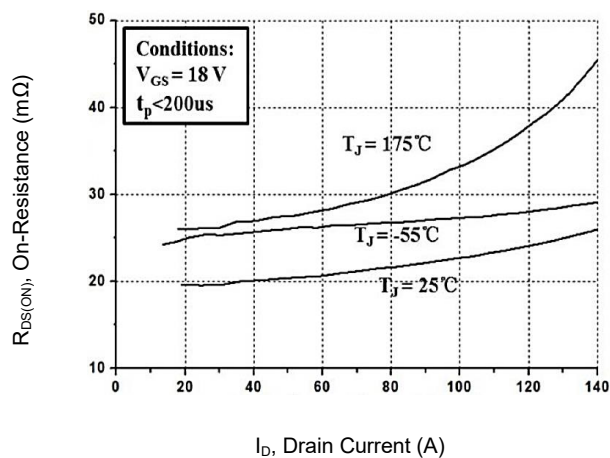
Transfer Characteristic



Normalized On-Resistance vs. Junction temperature

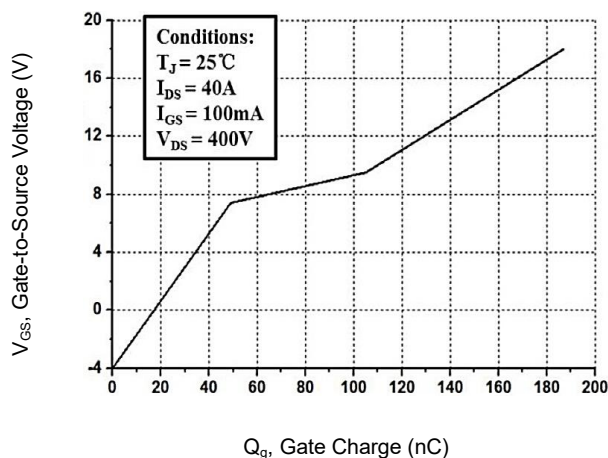


On-Resistance vs. Drain Current

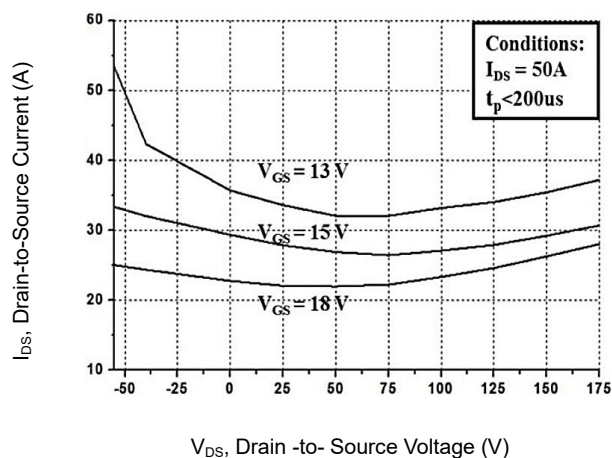


CHARACTERISTIC CURVES

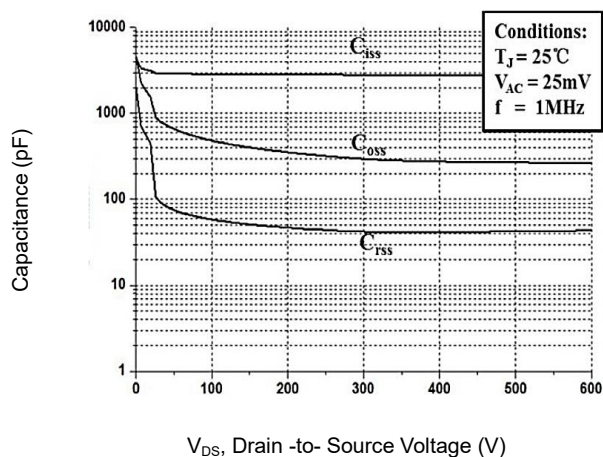
Gate-Charge Characteristics



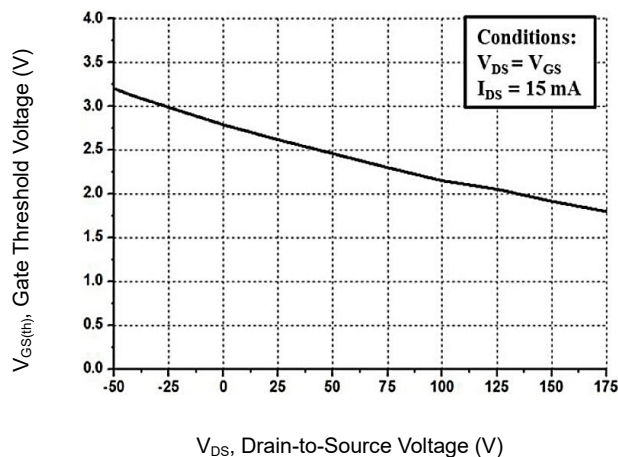
On-Resistance vs. Junction temperature for V_{GS}



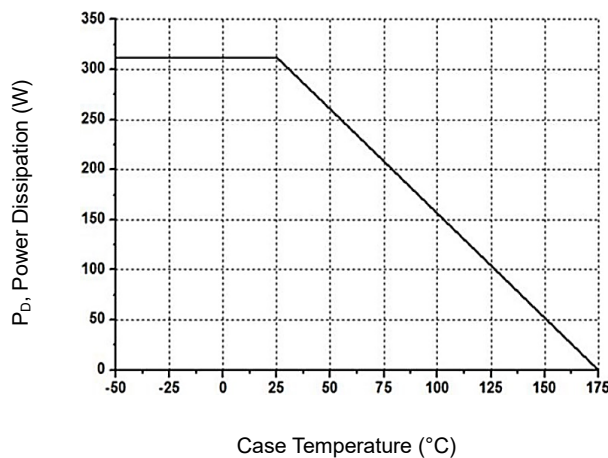
Capacitance vs. Drain-Source Voltage



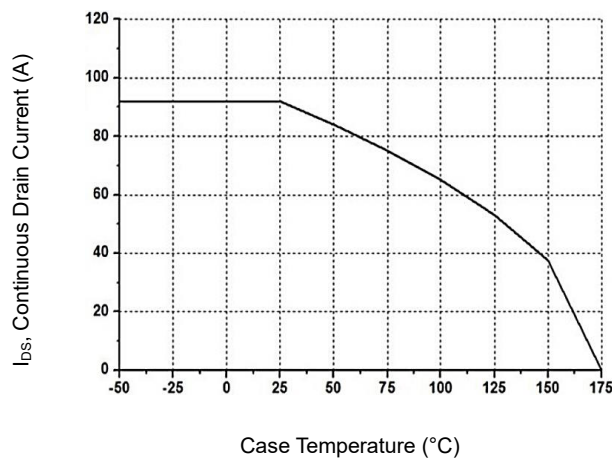
Threshold Voltage vs. Junction temperature



Maximum Power Dissipation Derating

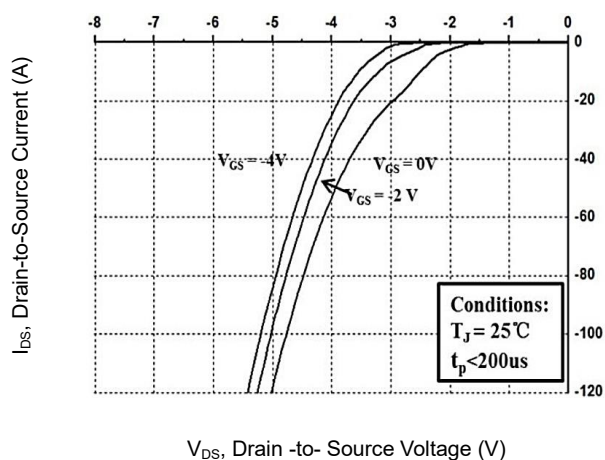


Continuous Drain Current vs. Case Temperature

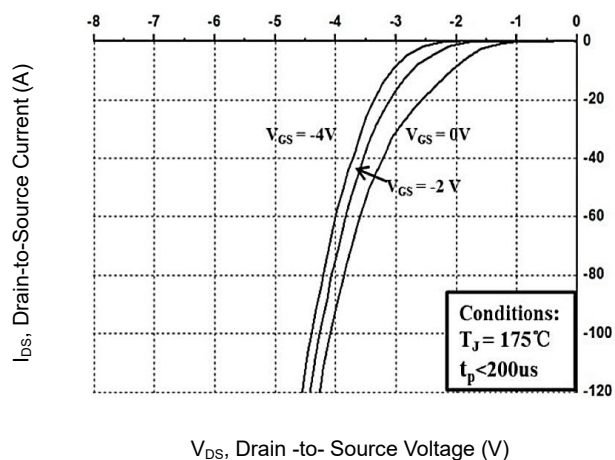


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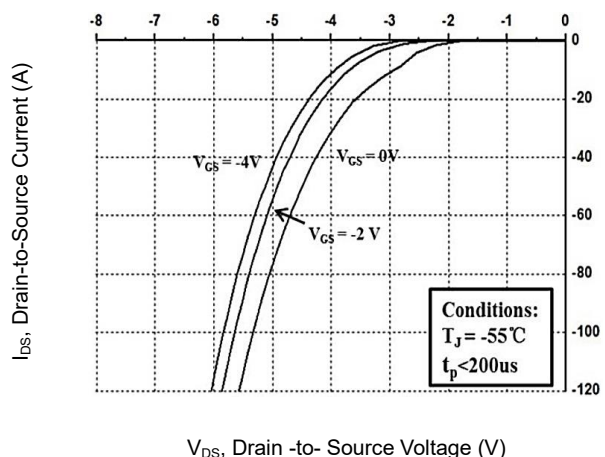
Body Diode Characteristics



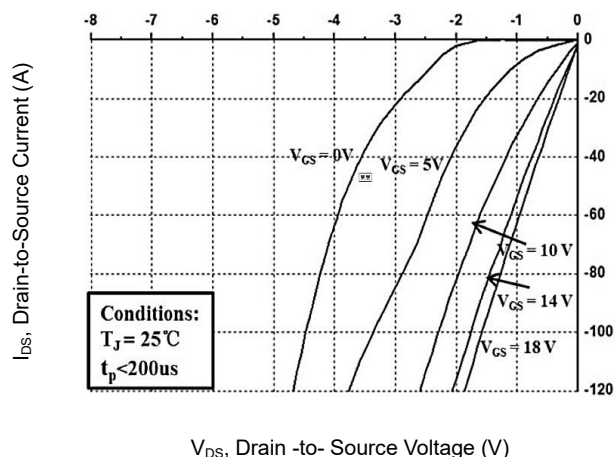
Body Diode Characteristics



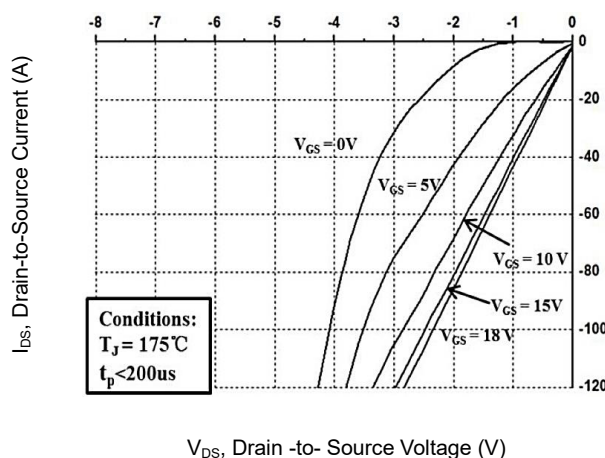
Body Diode Characteristics



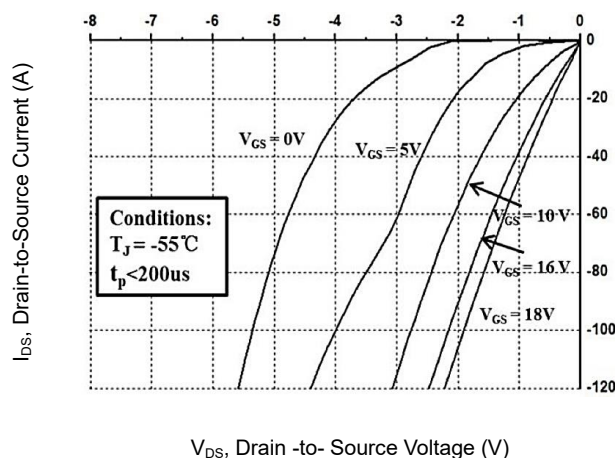
3rd Quadrant Characteristics



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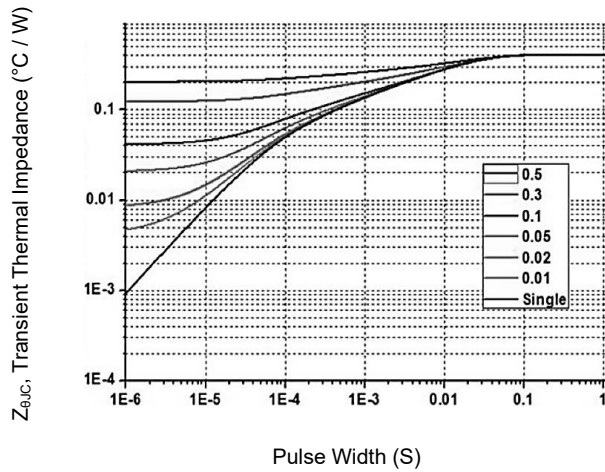


3rd Quadrant Characteristics

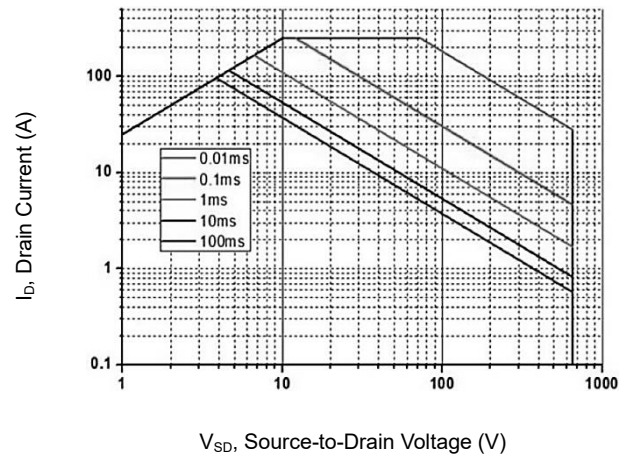


CHARACTERISTIC CURVES

Transient Thermal Impedance



Safe Operating Area



Output Capacitor Stored Energy

