

Silicon Carbide MOSFET

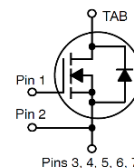
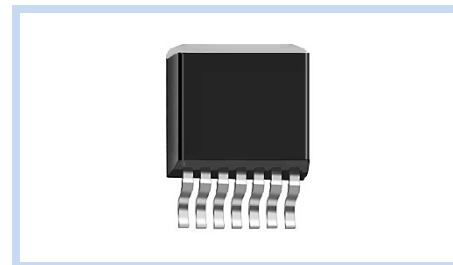
N-Channel 1200V 65A TO-263-7

MFTC120N65T2637

MERITEK

FEATURE

- $R_{DS(ON)} < 52m\Omega$ at $V_{GS}=18V$, $I_D=33.3A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low Reverse Recovery Charge
- Applications: High Voltage DC-DC Converter, Switch Mode Power Supplier, EV Battery Chargers



MECHANICAL DATA

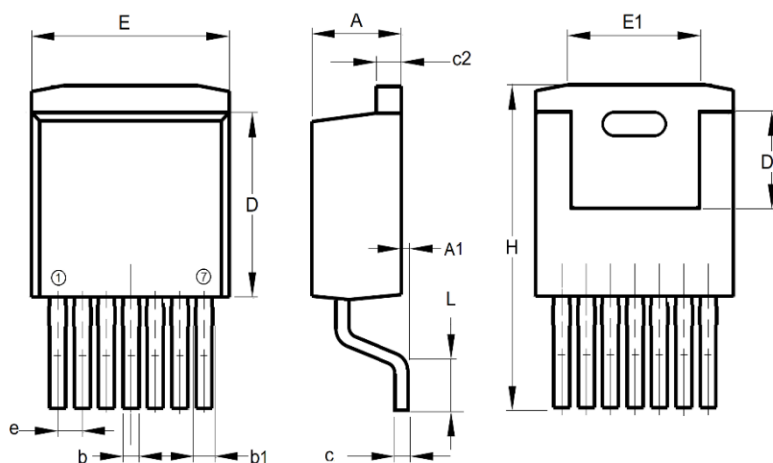
- Case: TO-263-7 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	1200	V
Gate-Source Voltage	Absolute Maximum Values	V_{GS}	-8/+22	V
	Recommended Operational Values		-4/+18	
Continuous Drain Current	$V_{GS}=20V$, $T_C=25^\circ C$	I_D	65	A
	$V_{GS}=20V$, $T_C=100^\circ C$		43	
Power Dissipation	$T_C=25^\circ C$	P_D	375	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.4	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

DIMENSION	Min	Max
A	4.30	4.60
A1	0	0.25
b	0.50	0.70
b1	0.60	0.90
c	0.40	0.60
c2	1.20	1.40
D	8.88	9.28
D1	4.65	6.65
e	1.27 BSC	
E	10.08	10.28
E1	6.82	7.97
H	14.80	16.0
L	1.90	2.75



Note: Pin Layout: Tab: Drain; 1: Gate; 2: Driver Source;
3,4,5,6,7,8: Power Source

Silicon Carbide MOSFET

N-Channel 1200V 65A TO-263-7

MFTC120N65T2637

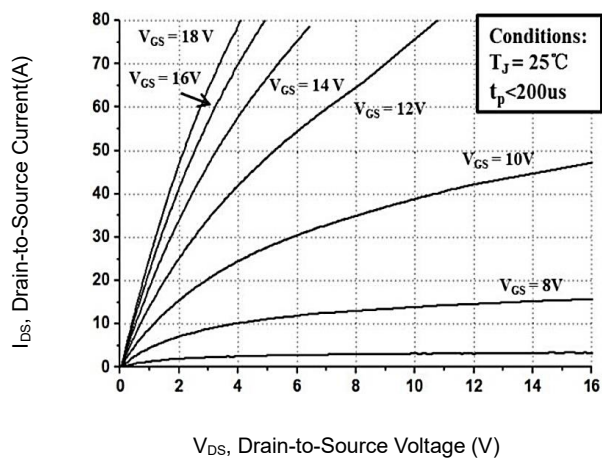
MERITEK

ELECTRICAL CHARACTERISTICS

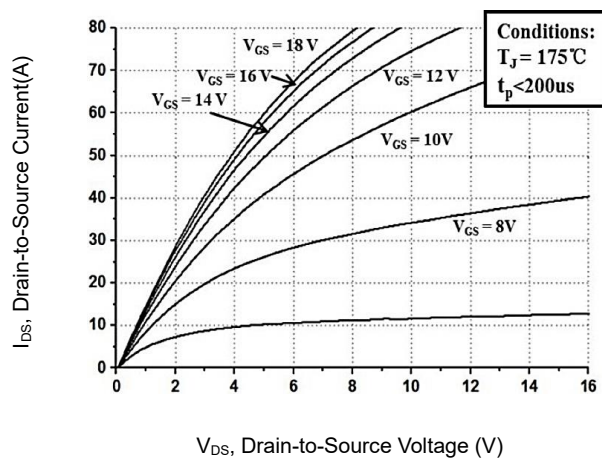
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	1200	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=1200V, V_{GS}=0V$	I_{DSS}	--	1	100	μA
Gate-Body Leakage Current, Forward	$V_{GS}=22V, V_{DS}=0V$	I_{GSSF}	--	10	250	nA
Gate-Body Leakage Current, Reverse	$V_{GS}=-8V, V_{DS}=0V$	I_{GSSF}	--	10	250	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=18V, I_D=33.3A$	$R_{DS(ON)}$	--	40	52	m Ω
	$V_{GS}=18V, I_D=33.3A, T_J=175^\circ C$		--	75	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=9.2mA$	$V_{GS(th)}$	1.9	2.6	4.0	V
	$V_{GS}=V_{DS}, I_D=9.2mA, T_J=175^\circ C$		--	1.8	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=800V, I_D=30A, V_{GS}= -4/+18V$	Q_g	--	120	--	nC
Gate-Source Charge		Q_{gs}	--	32.3	--	
Gate-Drain Charge		Q_{gd}	--	18.4	--	
Turn-On Delay Time	$V_{DS}=800V, I_D=30A, R_L=20\Omega$ $V_{GS}= -4/+18V, R_{GEN}=2.5\Omega,$	$T_{d(on)}$	--	24.5	--	nS
Rise Time		T_r	--	21.5	--	
Turn-Off Delay Time		$T_{d(off)}$	--	99	--	
Fall Time		T_f	--	33	--	
Turn-On Switching Loss	$V_{DS}=800V, I_D=30A, L=100\mu H$ $V_{GS}= -4/+18V, R_{GEN}=2.5\Omega,$	E_{ON}	--	687	--	μJ
Turn-Off Switching Loss		E_{OFF}	--	418	--	
Input Capacitance	$V_{DS}=1000V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	C_{iss}	--	2080	--	pF
Output Capacitance		C_{oss}	--	86	--	
Reverse Transfer Capacitance		C_{rss}	--	15	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Voltage	$V_{GS}= -4V, I_{SD}=16.5A$	V_{SD}	--	4.2	--	V
	$V_{GS}= -4V, I_{SD}=16.5A, T_J=175^\circ C$		--	3.9	--	
Diode Forward Current - Continuous	$T_C=25^\circ C$	I_S	--	--	65	A
Peak Reverse Recovery Current	$V_R=800V, I_{SD}=30A,$	I_{rm}	--	5	--	A
Reverse Recovery Time		T_{rr}	--	29	--	nS
Reverse Recovery Charge		Q_{rr}	--	77	--	nC

CHARACTERISTIC CURVES

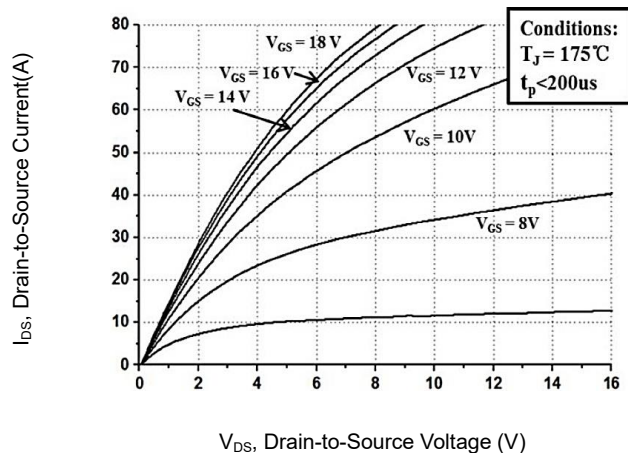
Output Characteristics



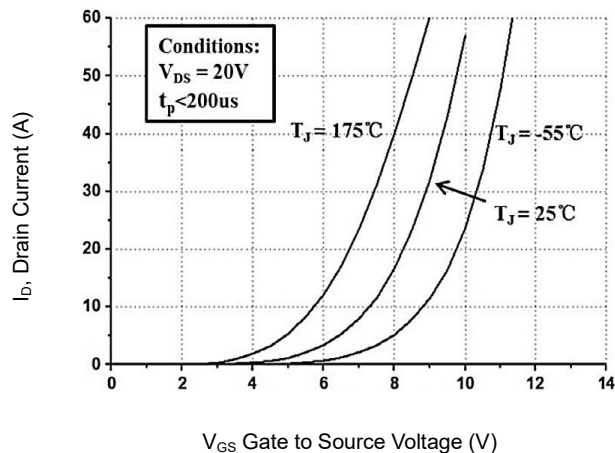
Output Characteristics



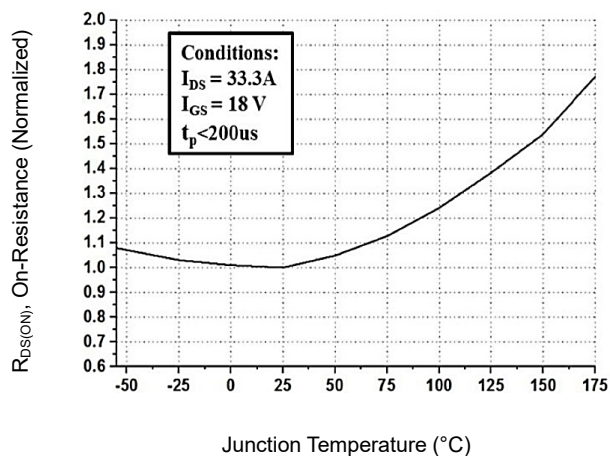
Output Characteristics



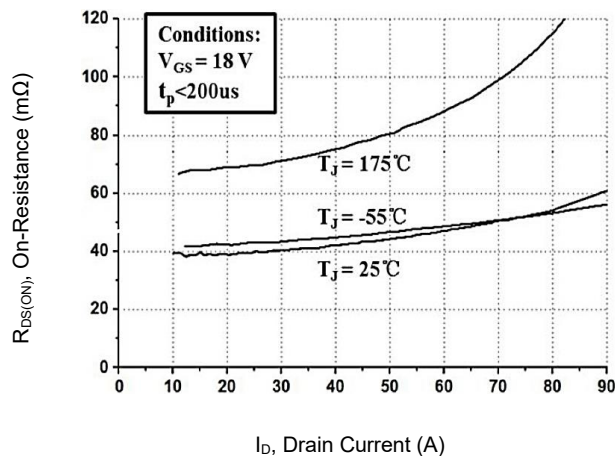
Transfer Characteristic



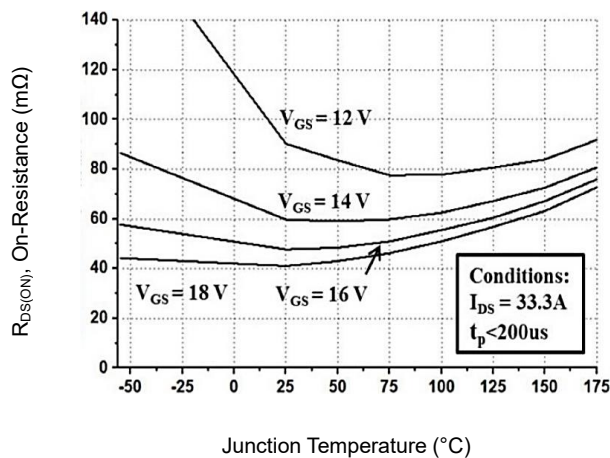
Normalized On-Resistance vs. Junction temperature



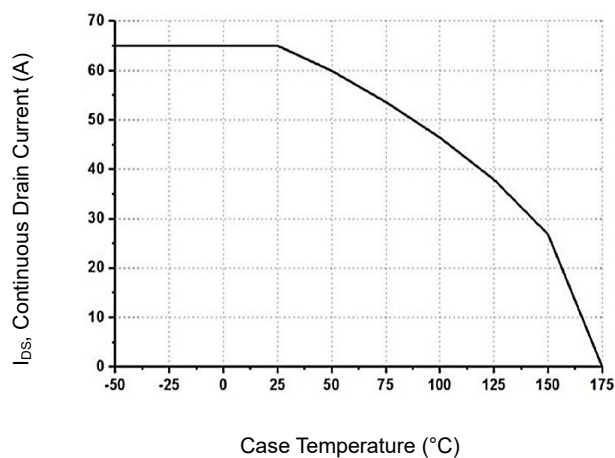
On-Resistance vs. Drain Current



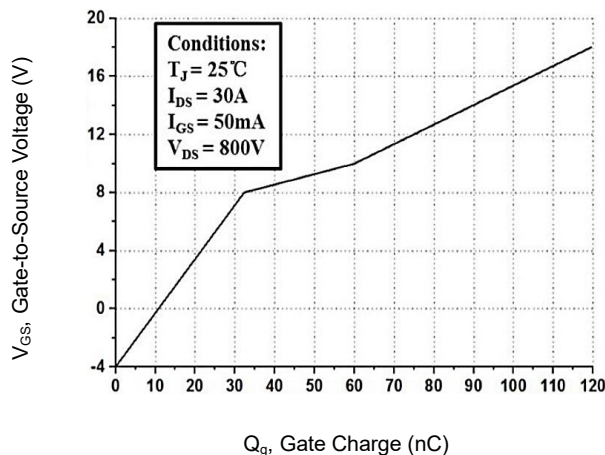
CHARACTERISTIC CURVES

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


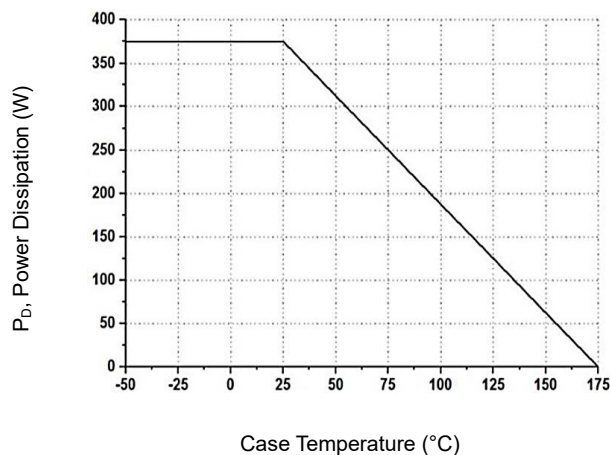
Continuous Drain Current vs. Case Temperature



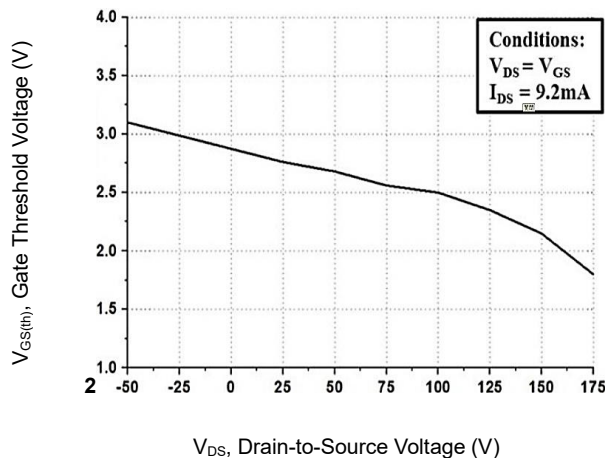
Gate-Charge Characteristics



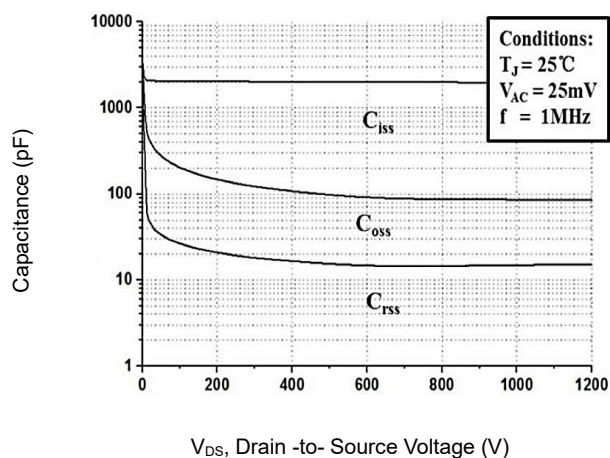
Maximum Power Dissipation Derating



Threshold Voltage vs. Junction temperature

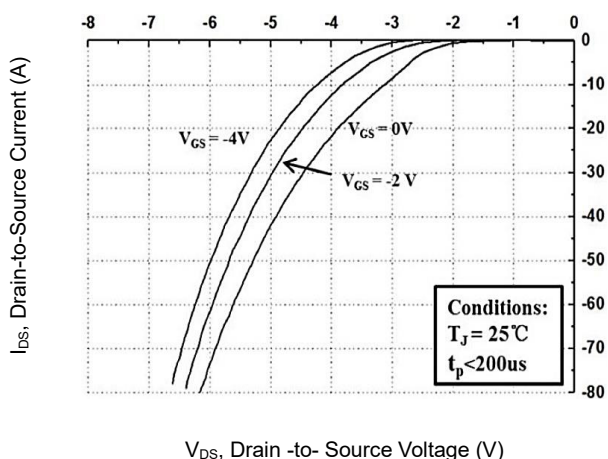


Capacitance vs. Drain-Source Voltage

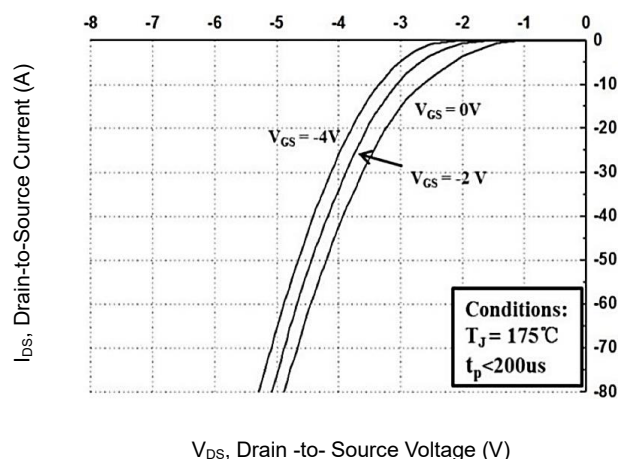


CHARACTERISTIC CURVES

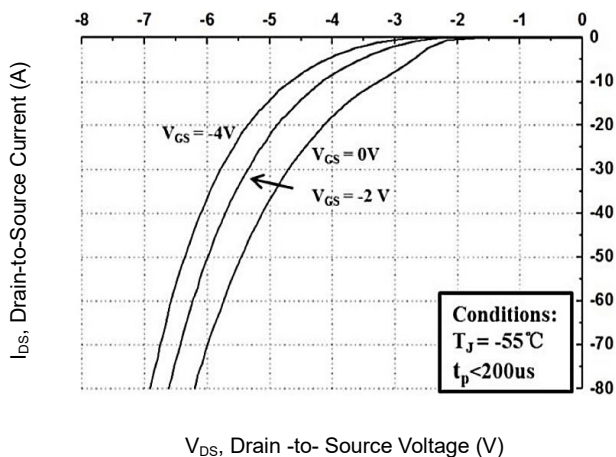
Body Diode Characteristics



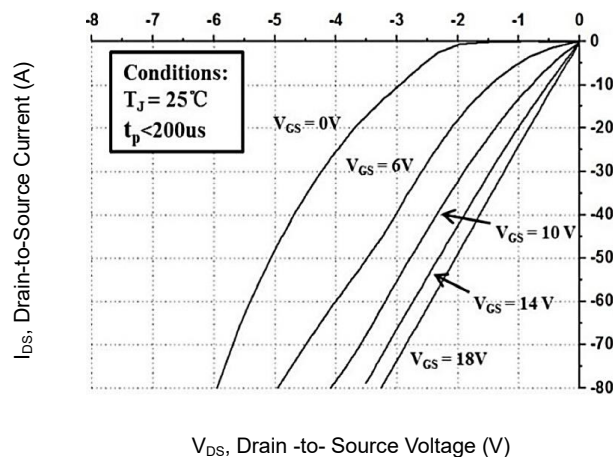
Body Diode Characteristics



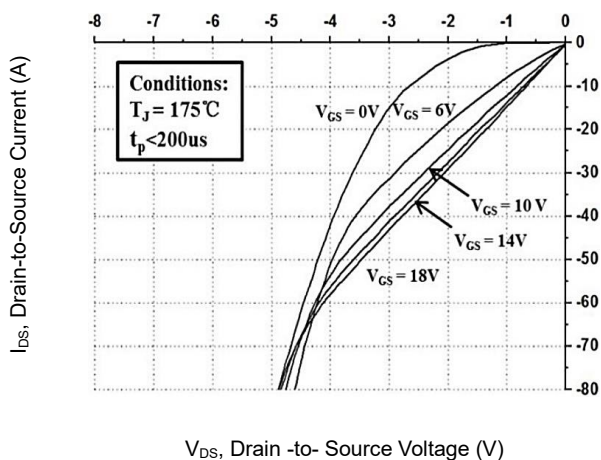
Body Diode Characteristics



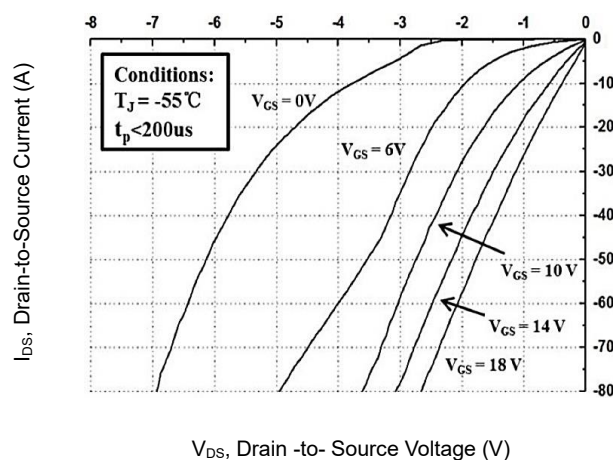
3rd Quadrant Characteristics



3rd Quadrant Characteristics

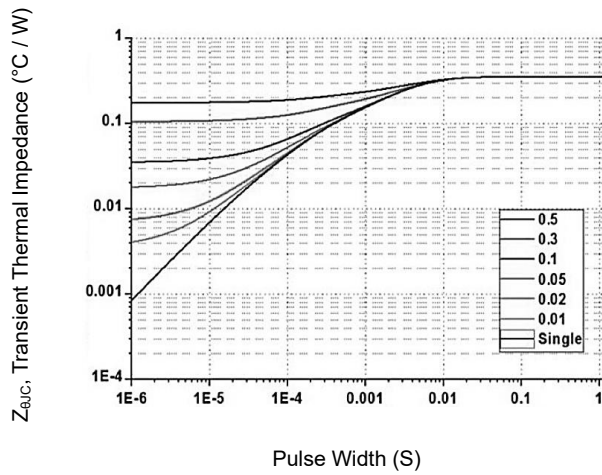


3rd Quadrant Characteristics

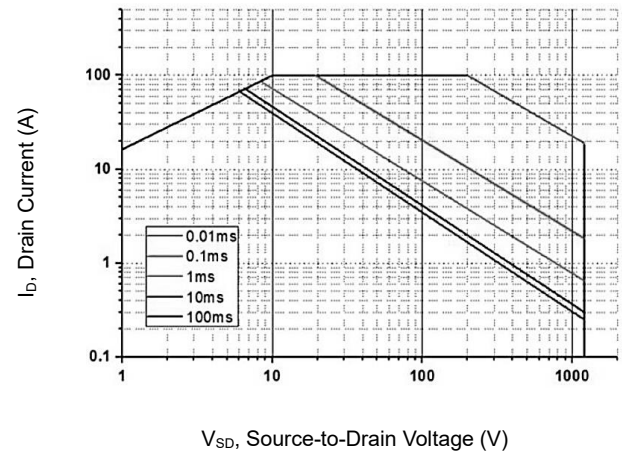


CHARACTERISTIC CURVES

Transient Thermal Impedance



Safe Operating Area



Output Capacitor Stored Energy

