

Silicon Carbide MOSFET

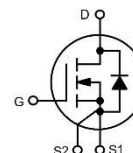
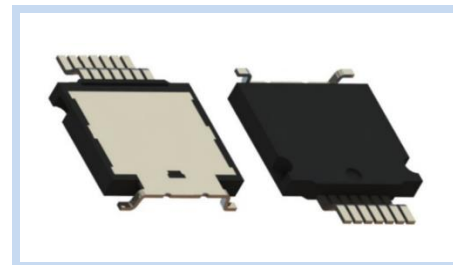
N-Channel 1200V 90A T2PAK

MFTC120N90T2PAK

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FEATURE

- $R_{DS(ON)} < 26m\Omega$ at $V_{GS}=18V$, $I_D=60A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low Reverse Recovery Charge
- Applications: High Voltage DC-DC Converter, Switching Mode Power Supplier, Motor Drive, Renewable Energy



MECHANICAL DATA

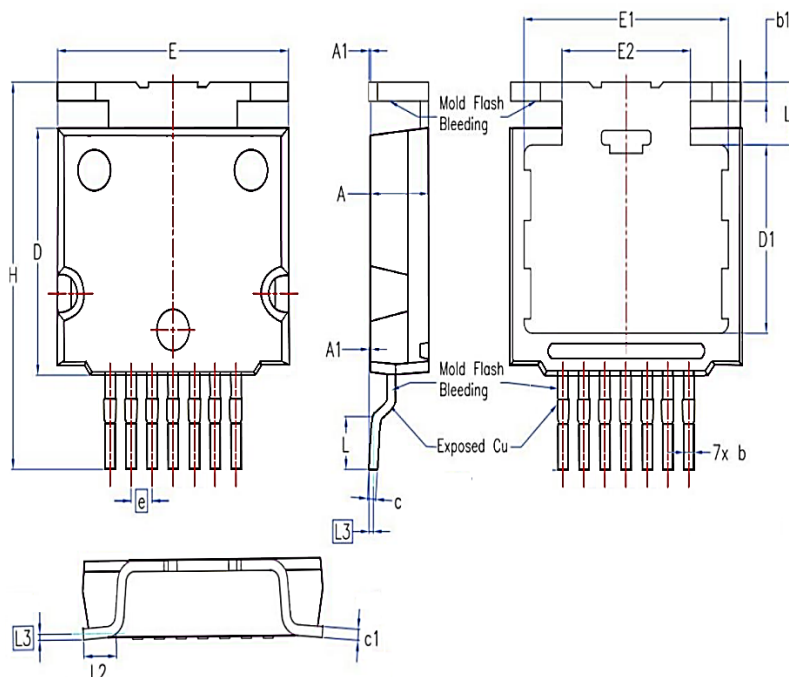
- Case: T2PAK Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	1200	V
Gate-Source Voltage	Dynamic ($f > 1Hz$)	V_{GS}	-10/+25	V
	Static		-4/+18	V
Drain Current – Continuous	$V_{GS}=18V$, $T_C=25^\circ C$	I_D	90	A
	$V_{GS}=18V$, $T_C=100^\circ C$		64	A
Drain Current – Pulse with t_p Limited by T_{jmax}	at 1ms	I_{DM}	223	A
	at 100μs		484	
Power Dissipation	$T_C=25^\circ C$	P_D	341	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.44	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

DIMENSION	Min	Max
A	3.40	3.60
A1	0.00	0.25
b	0.50	0.70
b1	0.80	1.00
c	0.40	0.60
c1	0.40	0.60
D	11.70	11.90
D1	8.80	9.10
e	1.27 BSC	
E	13.90	14.10
E1	12.30	12.50
E2	7.75	7.85
H	18.00	19.00
L	2.30	2.75
L1	3.05 BSC	
L2	1.70	2.15
L3	0.26 BSC	



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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}	1200	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=1200V, V_{GS}=0V$	I_{DSS}	--	1	50	μA
Gate-Body Leakage Current, Forward	$V_{GS}=18V, V_{DS}=0V$	I_{GSSF}	--	--	250	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=18V, I_D=60A$	$R_{DS(ON)}$	--	20	26	m Ω
	$V_{GS}=18V, I_D=60A, T_J=175^\circ C$		--	29	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=20mA$	$V_{GS(th)}$	--	2.9	--	V
	$V_{GS}=V_{DS}, I_D=20mA, T_J=175^\circ C$		--	2.0	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=800V, I_D=60A, V_{GS}= -4/+18V$	Q_g	--	235	--	nC
Gate-Source Charge		Q_{gs}	--	73.6	--	
Gate-Drain Charge		Q_{gd}	--	69.8	--	
Input Capacitance	$V_{DS}=1000V, V_{GS}=0V, V_{AC}=25mV$ $f=100kHz$	C_{iss}	--	4600	--	pF
Output Capacitance		C_{oss}	--	186	--	
Reverse Transfer Capacitance		C_{rss}	--	11	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Voltage	$V_{GS}= -4V, I_{SD}=30A$	V_{SD}	--	3.9	--	V
	$V_{GS}= -4V, I_{SD}=30A, T_J=175^\circ C$		--	3.5	--	
Diode Forward Current - Continuous	$V_{GS}= -4V, T_C=25^\circ C$	I_S	--	84	--	A

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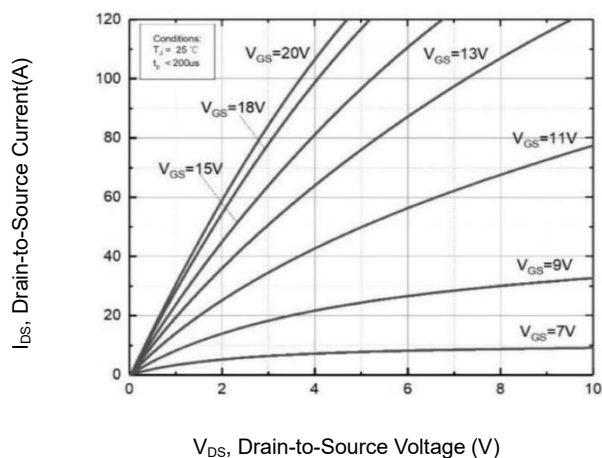
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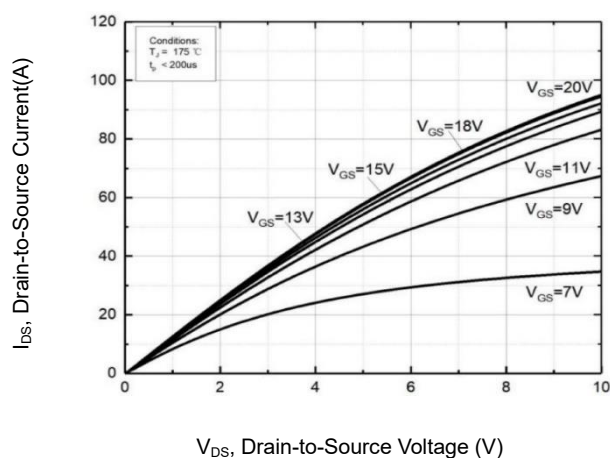
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CHARACTERISTIC CURVES

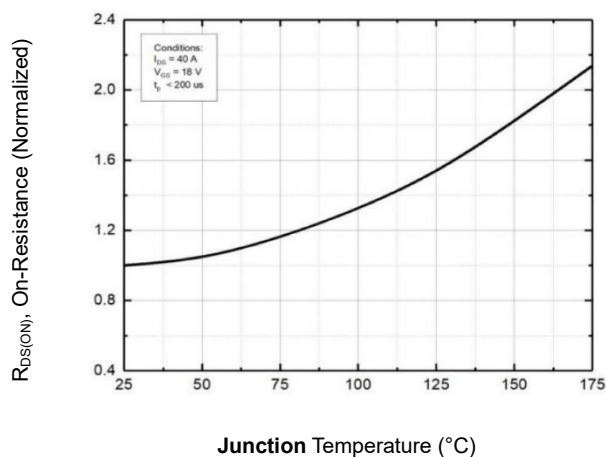
Output Characteristics



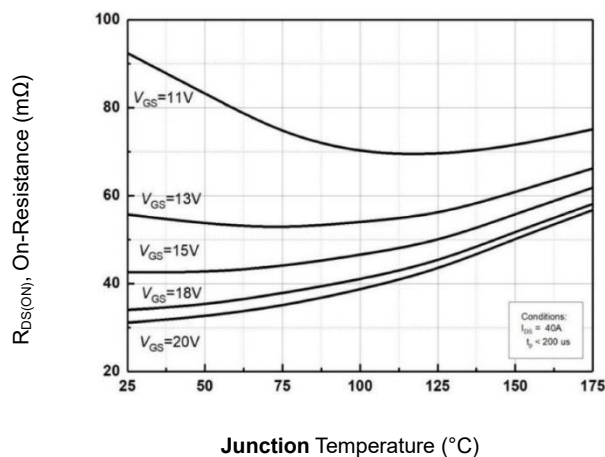
Output Characteristics



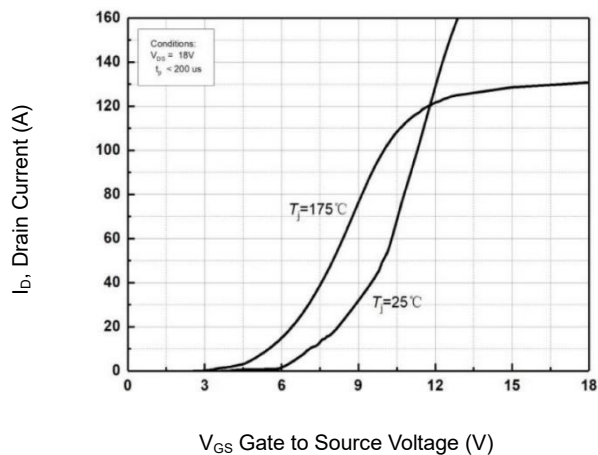
Normalized On-Resistance vs. Junction temperature



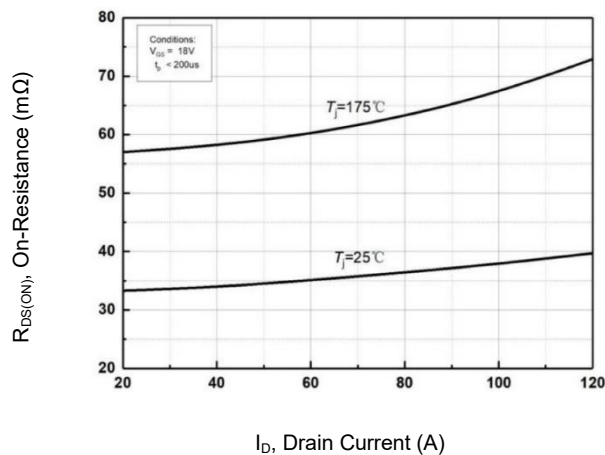
On-Resistance vs. Junction temperature for VGS



Transfer Characteristic

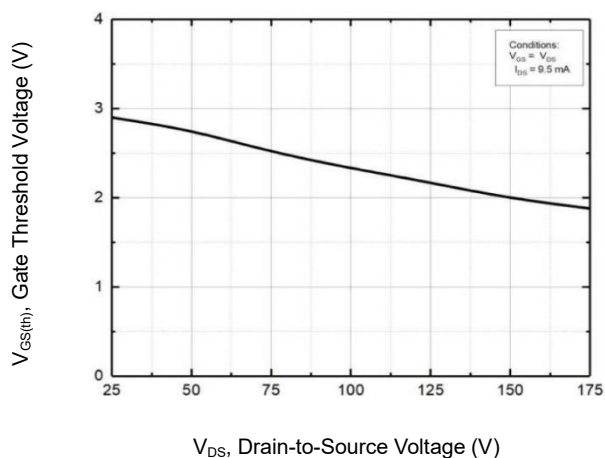


On-Resistance vs. Drain Current

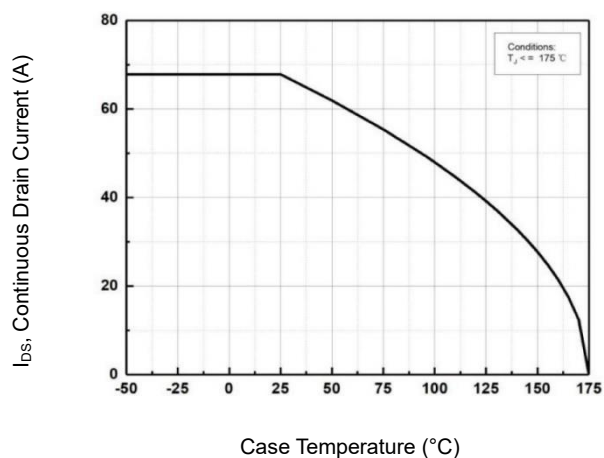


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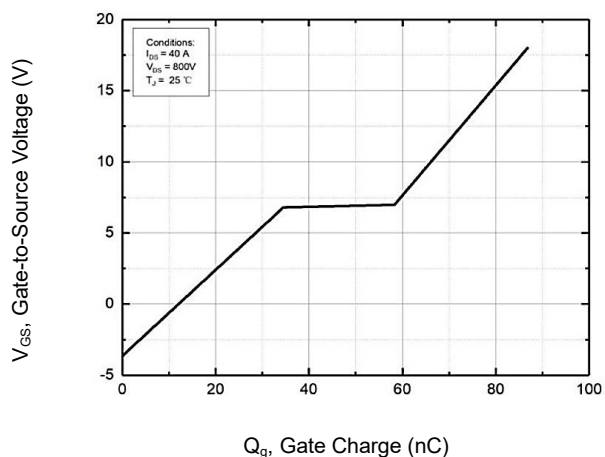
Threshold Voltage vs. Junction temperature



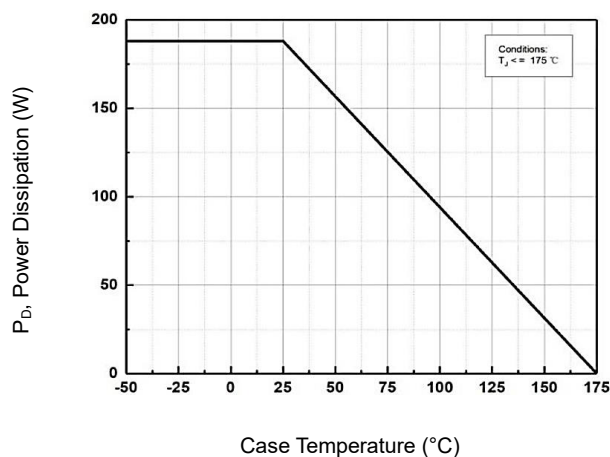
Continuous Drain Current vs. Case Temperature



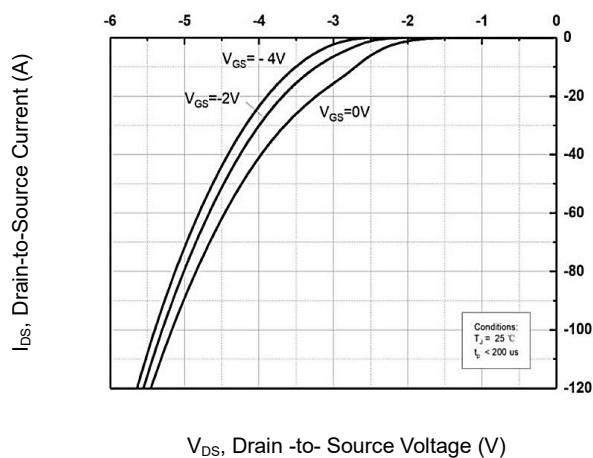
Gate-Charge Characteristics



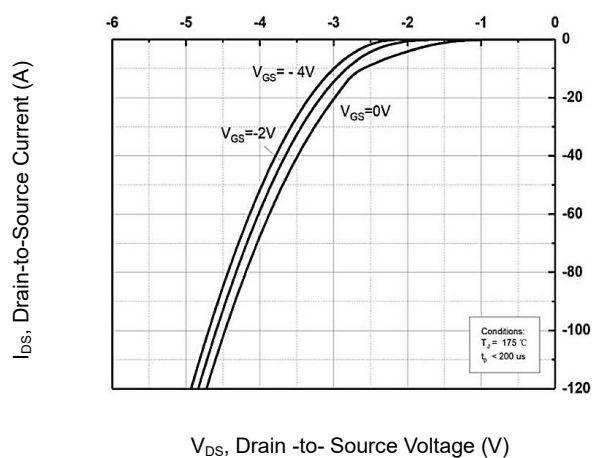
Maximum Power Dissipation Derating



Body Diode Characteristics



Body Diode Characteristics



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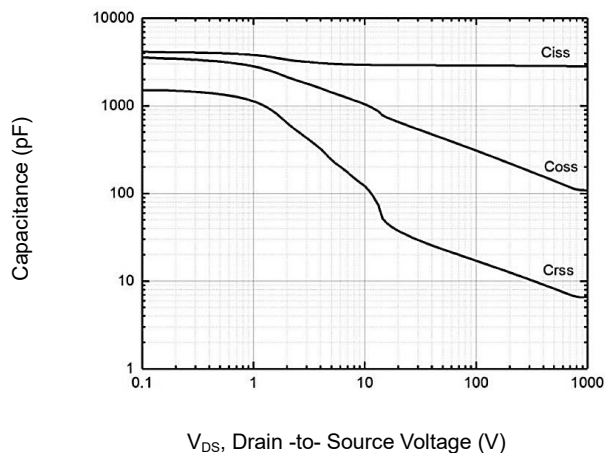
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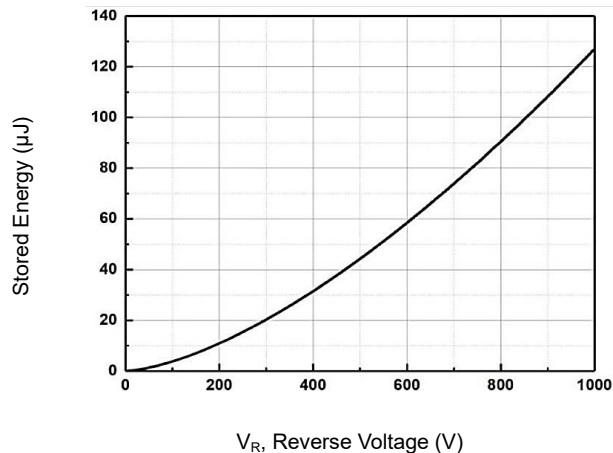
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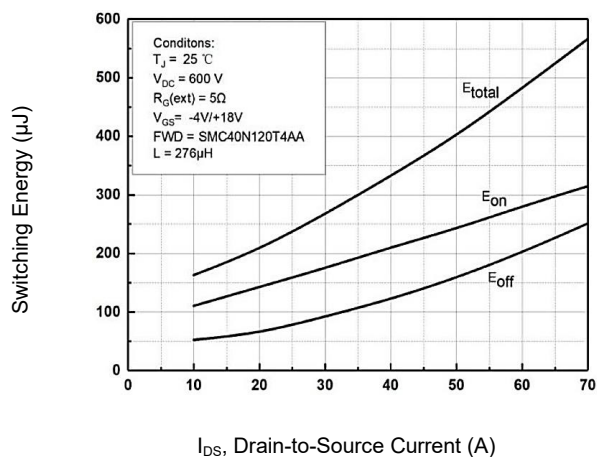
Capacitance vs. Drain-Source Voltage



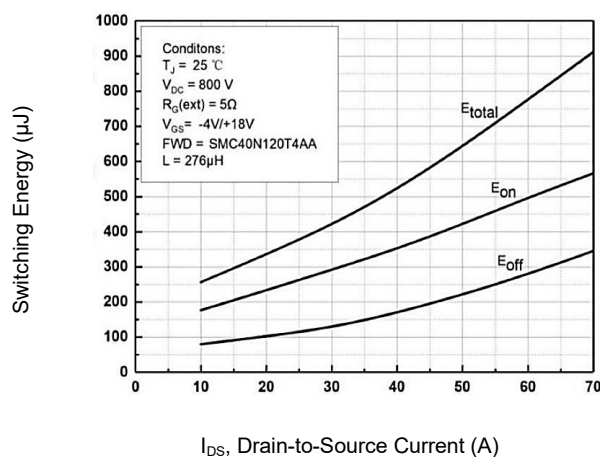
Output Capacitor Stored Energy



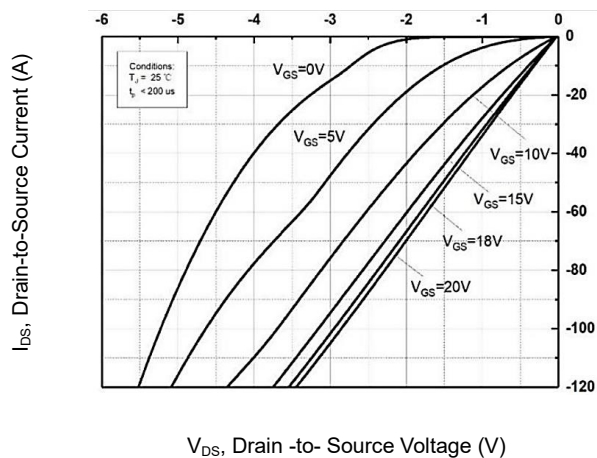
Switching energy vs Drain current at 600V



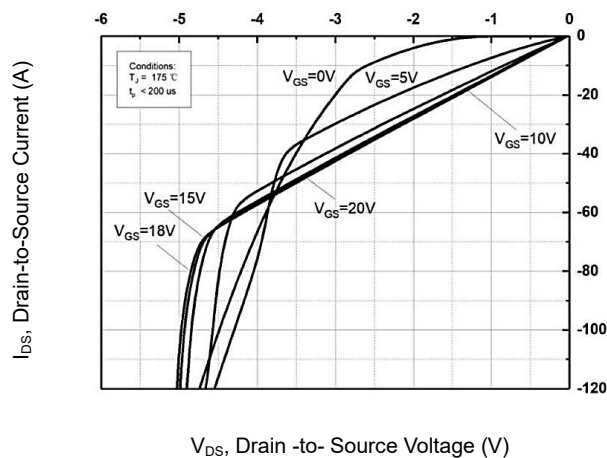
Switching energy vs Drain current at 800V



3rd Quadrant Characteristics

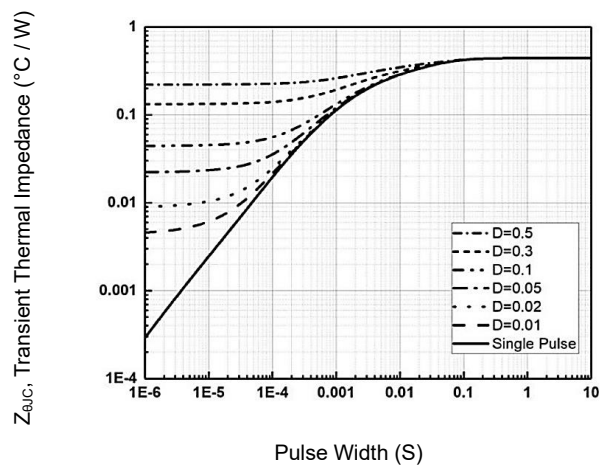


3rd Quadrant Characteristics



CHARACTERISTIC CURVES

Transient Thermal Impedance



Safe Operating Area

