

Silicon Carbide MOSFET

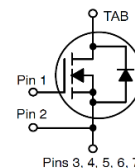
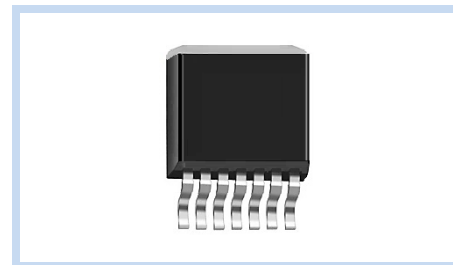
N-Channel 900V 35A TO-263-7

MFTC90N35T2637

MERITEK

FEATURE

- $R_{DS(ON)} < 75m\Omega$ at $V_{GS}=18V$, $I_D=20A$
- 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, Renewable Energy, Motor Drives



MECHANICAL DATA

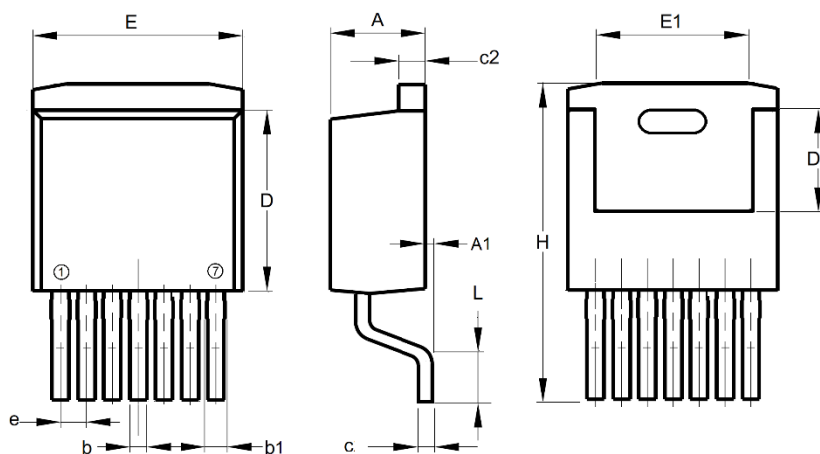
- Case: TO-263-7 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	900	V
Gate-Source Voltage	Absolute Maximum Value	V_{GS}	-8/+22	V
	Recommended operational values		-4/+18	
Continuous Drain Current	$V_{GS}=18V$, $T_C=25^\circ C$	I_D	35	A
	$V_{GS}=18V$, $T_C=100^\circ C$		23	
Power Dissipation	$T_C=25^\circ C$	P_D	136	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.84	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

DIMENSION	Min (mm)	Max (mm)
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

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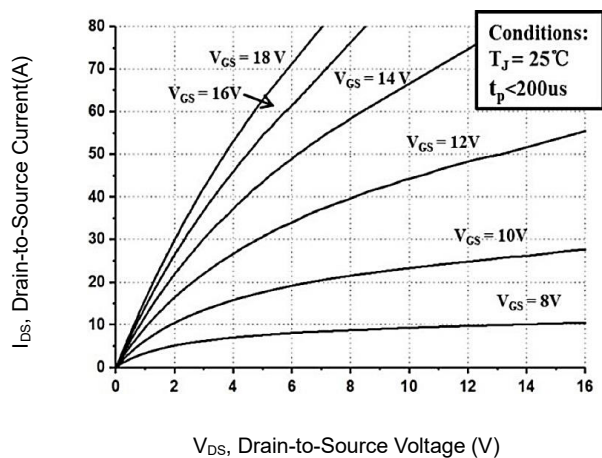
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ELECTRICAL CHARACTERISTICS

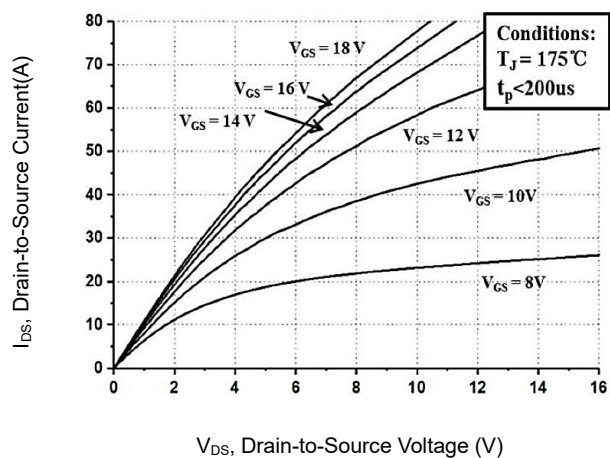
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	900	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=900V, V_{GS}=0V$	I_{DSS}	--	1	100	μA
Gate-Body Leakage Current, Forward	$V_{GS}=22V, V_{DS}=0V$	I_{GSSF}	--	10	250	nA
Gate-Body 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	$V_{GS}=18V, I_D=20A$	$R_{DS(ON)}$	--	60	75	m Ω
	$V_{GS}=18V, I_D=20A, T_J=175^\circ C$		--	85	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=5mA$	$V_{GS(th)}$	1.9	2.6	4.0	V
	$V_{GS}=V_{DS}, I_D=5mA, T_J=175^\circ C$		--	1.8	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=400V, I_D=20A, V_{GS}= -4/+18V$	Q_g	--	42	--	nC
Gate-Source Charge		Q_{gs}	--	10	--	
Gate-Drain Charge		Q_{gd}	--	14	--	
Turn-On Delay Time	$V_{DS}=400V, I_D=20A, R_L=20\Omega,$ $V_{GS}= -4/+20V, R_{GEN}=2.5\Omega$	$T_{d(on)}$	--	39	--	nS
Rise Time		T_r	--	11	--	
Turn-Off Delay Time		$T_{d(off)}$	--	19	--	
Fall Time		T_f	--	10	--	
Turn-On Switching Loss	$V_{DS}=400V, I_D=20A, L=100\mu H,$ $V_{GS}= -4/+20V, R_{GEN}=2.5\Omega$	E_{ON}	--	386	--	mJ
Turn-Off Switching Loss		E_{OFF}	--	55	--	
Input Capacitance	$V_{DS}=600V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	C_{iss}	--	1200	--	pF
Output Capacitance		C_{oss}	--	63	--	
Reverse Transfer Capacitance		C_{rss}	--	9.8	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Voltage	$V_{GS}= -4V, I_{SD}=10A$	V_{SD}	--	4.2	--	V
	$V_{GS}= -4V, I_{SD}=10A, T_J=175^\circ C$		--	3.9	--	
Diode Forward Current - Continuous	$T_C=25^\circ C$	I_S	--	--	34	A
Peak Reverse Recovery Current	$V_R=400V, I_{SD}=20A$	I_{rm}	--	3.7	--	A
Reverse Recovery Time		T_{rr}	--	28	--	nS
Reverse Recovery Charge		Q_{rr}	--	62	--	nC

CHARACTERISTIC CURVES

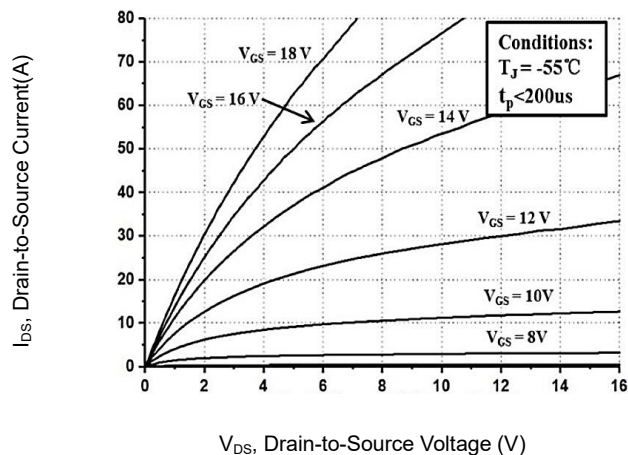
Output Characteristics



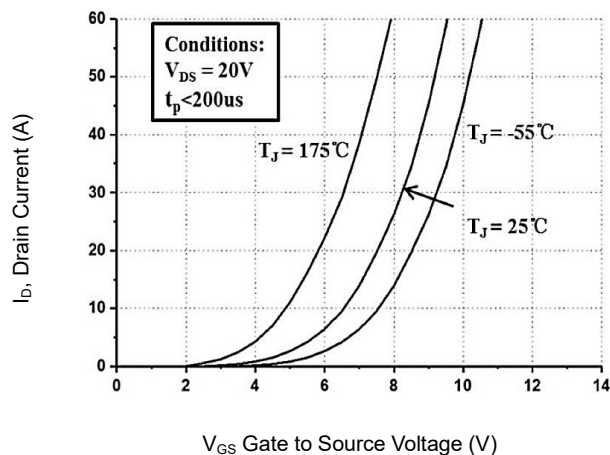
Output Characteristics



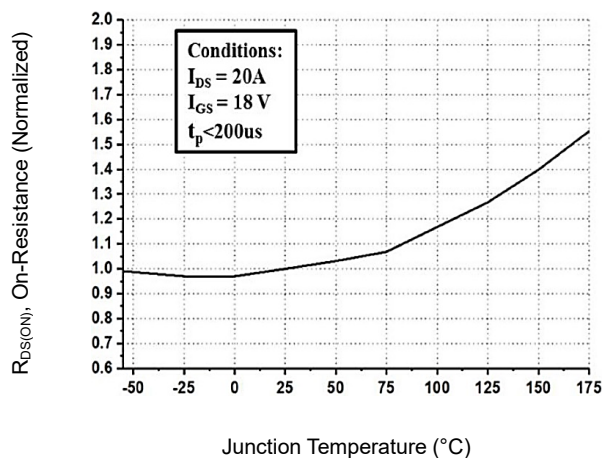
Output Characteristics



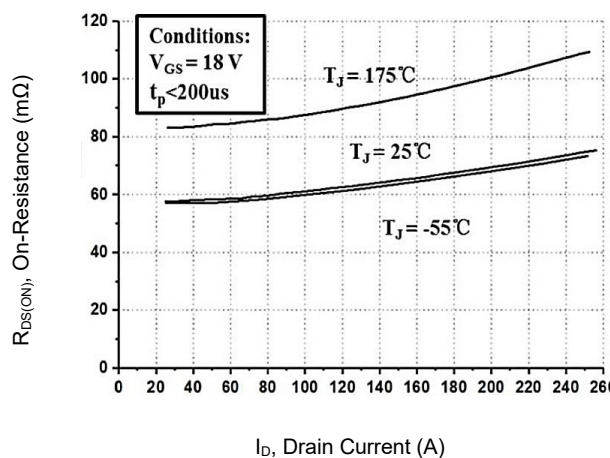
Transfer Characteristic



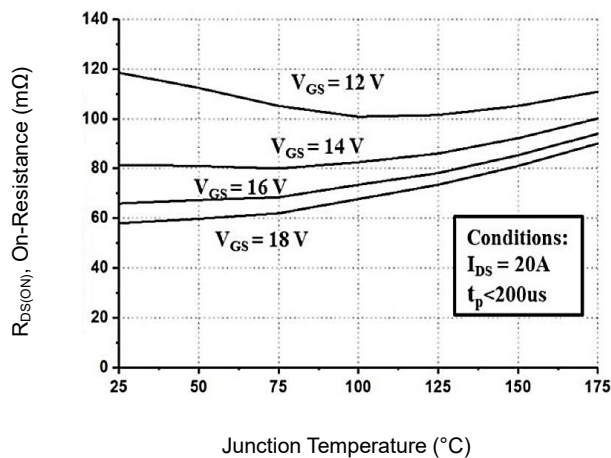
Normalized On-Resistance vs. Junction temperature



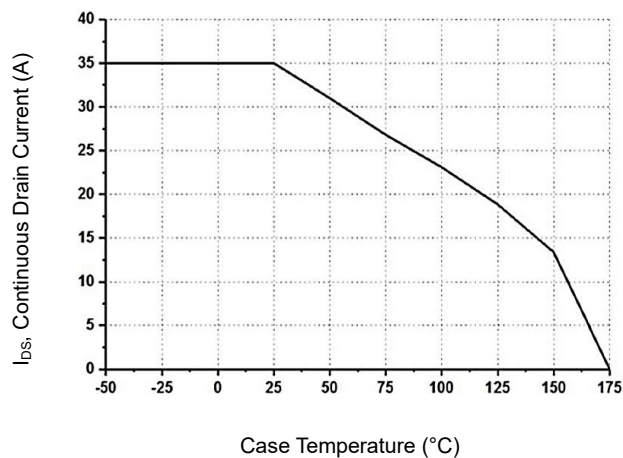
On-Resistance vs. Drain Current



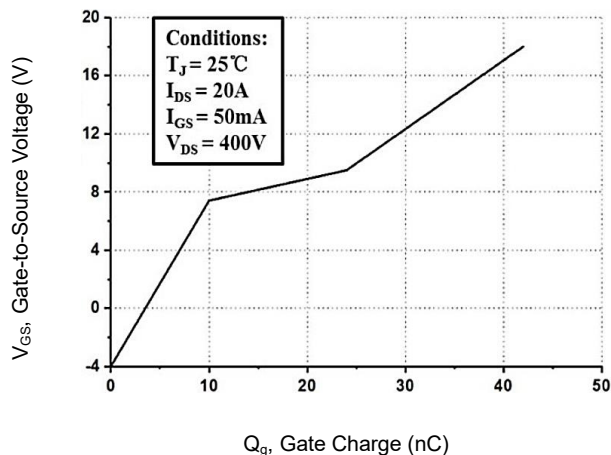
CHARACTERISTIC CURVES

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


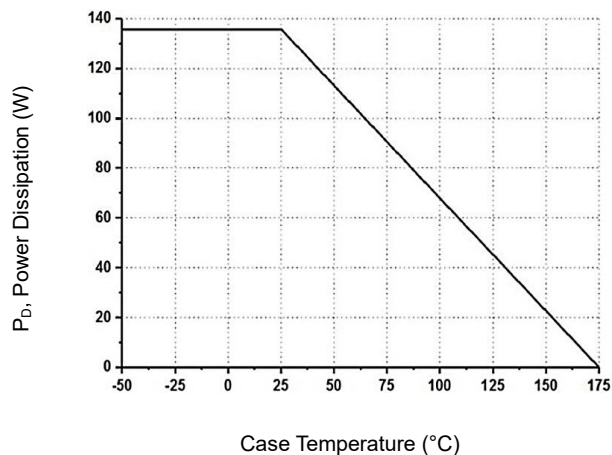
Continuous Drain Current vs. Case Temperature



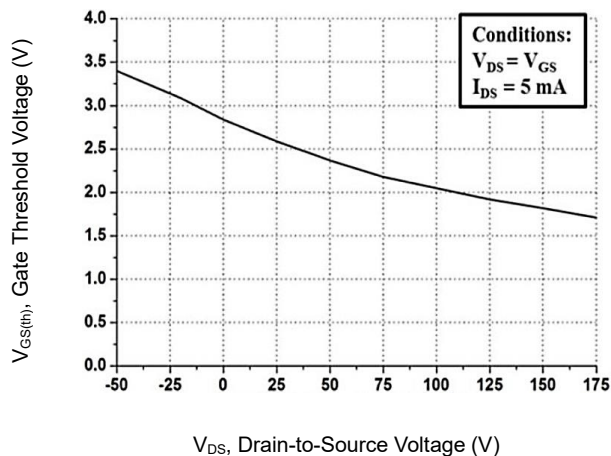
Gate-Charge Characteristics



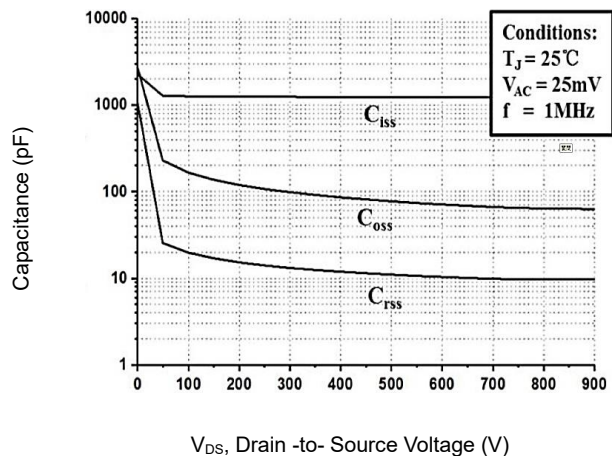
Maximum Power Dissipation Derating



Threshold Voltage vs. Junction temperature

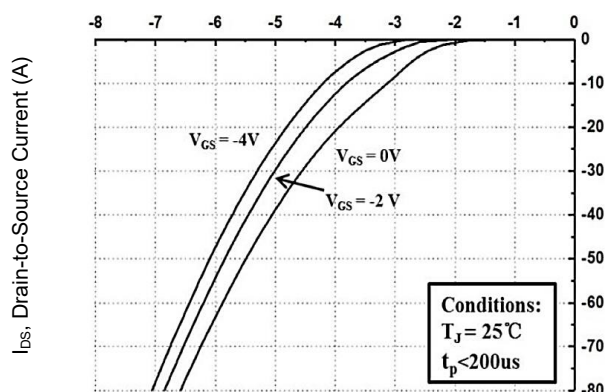


Capacitance vs. Drain-Source Voltage



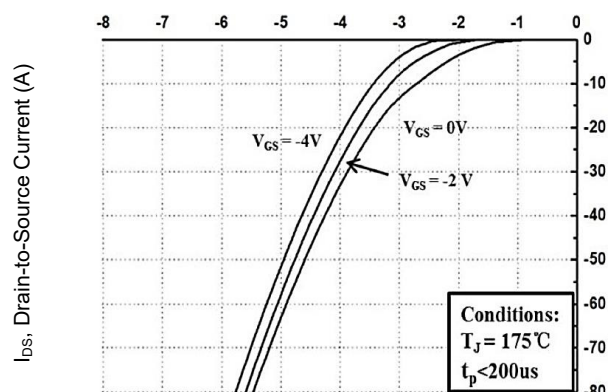
CHARACTERISTIC CURVES

Body Diode Characteristics



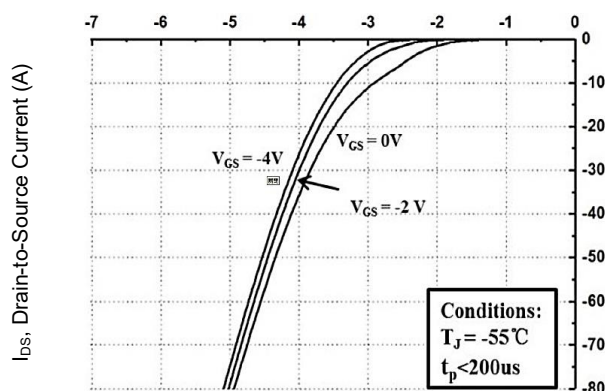
V_{DS} , Drain -to- Source Voltage (V)

Body Diode Characteristics



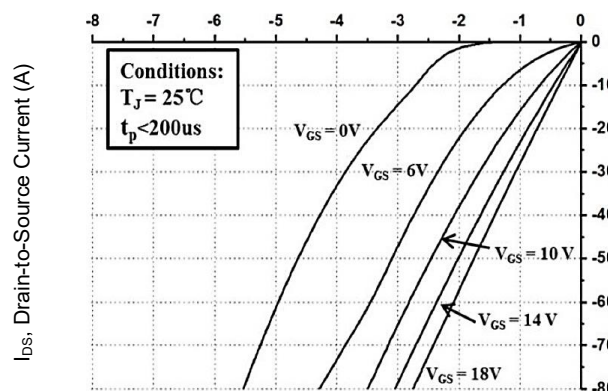
V_{DS} , Drain -to- Source Voltage (V)

Body Diode Characteristics



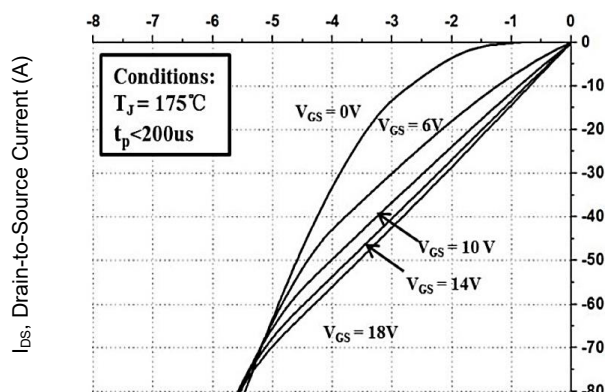
V_{DS} , Drain -to- Source Voltage (V)

3rd Quadrant Characteristics



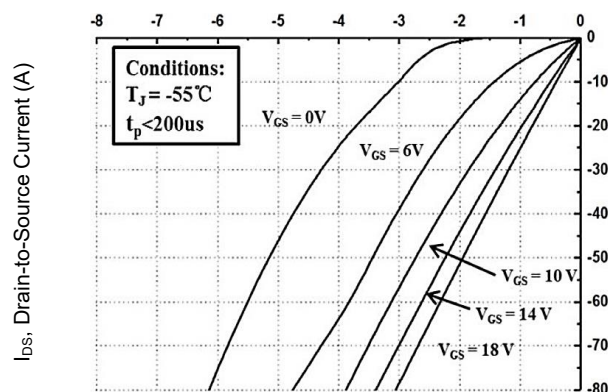
V_{DS} , Drain -to- Source Voltage (V)

3rd Quadrant Characteristics



V_{DS} , Drain -to- Source Voltage (V)

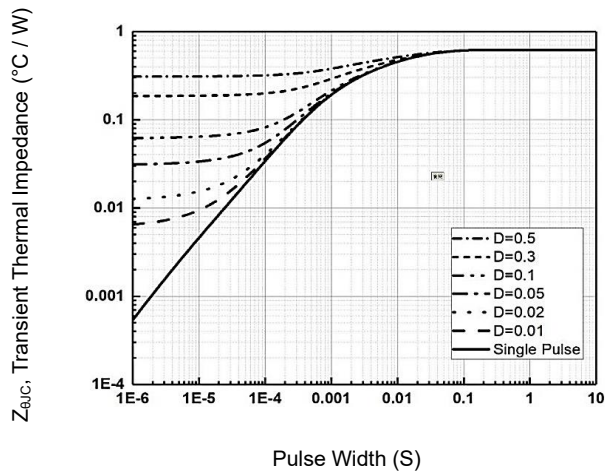
3rd Quadrant Characteristics



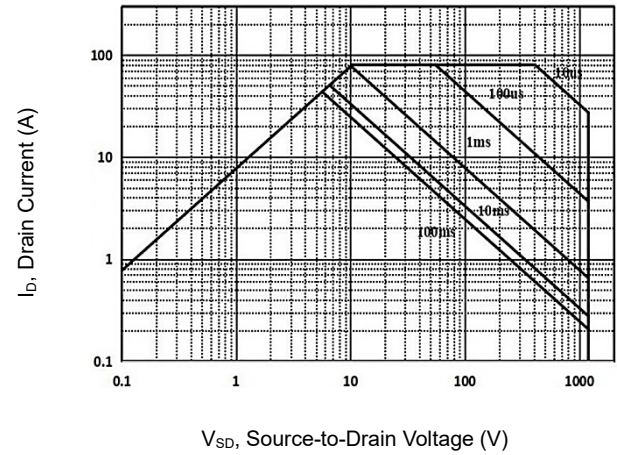
V_{DS} , Drain -to- Source Voltage (V)

CHARACTERISTIC CURVES

Transient Thermal Impedance



Safe Operating Area



Output Capacitor Stored Energy

