

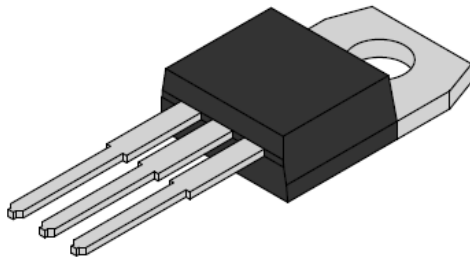
Features

- ◆ECMOS's Proprietary Trench IGTO Technology
- ◆Extremely Low $V_{CE,sat}$
- ◆Very Low E_{TS}
- ◆Integrated SuperBallast™ Technology for Safe, Simple Paralleling
- ◆Square Turn-Off SOA >4x Rated Current
- ◆Low turnoff voltage spike

Applications

- ◆UPS and Solar Inverters
- ◆Welding Equipment
- ◆Power Factor Correction

Product Summary



Current (A)	Voltage (V)	$V_{CE,sat}$ (V)	Package	Marking
30	600	1.4	TO220	

Absolute Maximum Ratings

Stresses above those specified under Absolute Maximum Ratings may cause permanent damage to the device and/or affect device reliability. These are stress ratings only; functional operation of the device at these or any other conditions outside those indicated in the Specification Table is not implied.

Absolute maximum ratings apply individually only, not in combination. Unless otherwise specified, all voltages are referenced to GND.

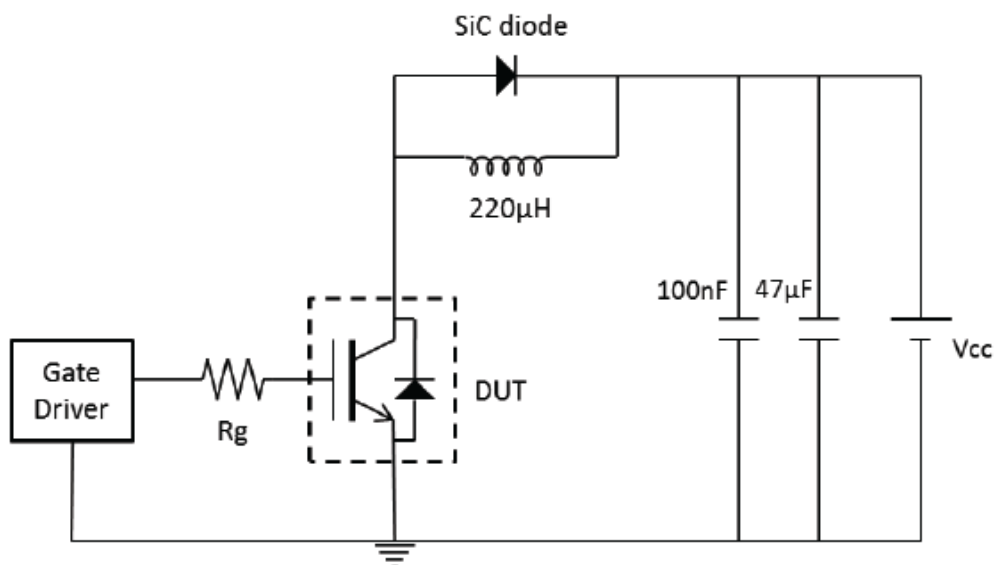
Symbol	Parameter	Min	Typ	Max	Unit
V_{CE}	Collector-to-Emitter Voltage			600	V
I_{CE}	DC Collector Current				
	TC = 25°C			60	A
	TC = 100°C			30	A
V_{GE}	Gate-to-Emitter Voltage	-20		20	V
T_J	Operating Junction Temperature	-40		150	°C
T_{STG}	Storage Temperature	-55		150	°C

Electrical Specifications

Typical values are at $T_J=25^{\circ}\text{C}$, unless otherwise specified. All limits at temperature extremes are guaranteed via correlation using standard statistical quality control (SQC).

Symbol	Parameter	Min	Typ	Max	Unit
$V_{BR,CES}$	Collector-to-Emitter Breakdown Voltage				
	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	600.0			V
$V_{CE,SAT}$	Collector-to-Emitter Saturation Voltage				
	$I_C=10\text{A}, V_{GE}=15\text{V}$		1.67		V
	$I_C=10\text{A}, V_{GE}=15\text{V}, T_J=150^{\circ}\text{C}$		1.4		V
	$I_C=20\text{A}, V_{GE}=15\text{V}$		2.1		V
V_{GE}	Gate Threshold Voltage				
	$V_{CE}=V_{GE}, I_C=250\mu\text{A}$		3.8	5.4	V
I_{CES}	Collector Leakage Current				
	$V_{GE}=0\text{V}, V_{CE}=600\text{V}$		0.2	20.0	μA
	$V_{GE}=0\text{V}, V_{CE}=600\text{V}, T_J=150^{\circ}\text{C}$		2000.0		μA
I_{CES}	Gate Leakage Current				
	$V_{GE}=20\text{V}, V_{CE}=0\text{V}$			200.0	nA
C_{IES}	Gate Emitter Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		3500.0		pF
C_{OES}	Output Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		24.0		pF
C_{RES}	Reverse Transfer Capacitance				
	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1\text{MHz}$		18.0		pF

Inductive Load Test Circuit





Switching Characteristics

$I_C=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $V_{CC}=400V$, $R_G=6\Omega$, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
$t_{d,ON}$	Turn-on Delay Time		44.0		ns
t_r	Turn-on Rise Time		51.0		ns
$t_{d,OFF}$	Turn-off Delay Time		135.0		ns
t_f	Turn-off Fall Time		75.0		ns
E_{ON}	Turn-on Switching Loss		0.34		mJ
E_{OFF}	Turn-off Switching Loss		0.32		mJ
E_{TS}	Total Switching Loss		0.66		mJ

$T_J=100^\circ C$, $I_C=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $V_{CC}=400V$, $R_G=6\Omega$, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
$t_{d,ON}$	Turn-on Delay Time		48.0		ns
t_r	Turn-on Rise Time		50.0		ns
$t_{d,OFF}$	Turn-off Delay Time		167.0		ns
t_f	Turn-off Fall Time		61.0		ns
E_{ON}	Turn-on Switching Loss		0.33		mJ
E_{OFF}	Turn-off Switching Loss		0.38		mJ
E_{TS}	Total Switching Loss		0.71		mJ

$T_J=150^\circ C$, $I_C=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $V_{CC}=400V$, $R_G=6\Omega$, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
$t_{d,ON}$	Turn-on Delay Time		50.0		ns
t_r	Turn-on Rise Time		51.0		ns
$t_{d,OFF}$	Turn-off Delay Time		210.0		ns
t_f	Turn-off Fall Time		84.0		ns
E_{ON}	Turn-on Switching Loss		0.34		mJ
E_{OFF}	Turn-off Switching Loss		0.55		mJ
E_{TS}	Total Switching Loss		0.89		mJ

$T_J=100^\circ C$, $I_C=20A$, $V_{CC}=400V$, $V_{GE}=15V/-8V$, $V_{CC}=400V$, $R_G=6\Omega$, Energy includes tail.

Symbol	Parameter	Min	Typ	Max	Unit
$t_{d,ON}$	Turn-on Delay Time		43.0		ns
t_r	Turn-on Rise Time		50.0		ns
$t_{d,OFF}$	Turn-off Delay Time		114.0		ns
t_f	Turn-off Fall Time		24.0		ns
E_{ON}	Turn-on Switching Loss		0.32		mJ
E_{OFF}	Turn-off Switching Loss		0.28		mJ
E_{TS}	Total Switching Loss		0.6		mJ

Typical Operating Characteristics

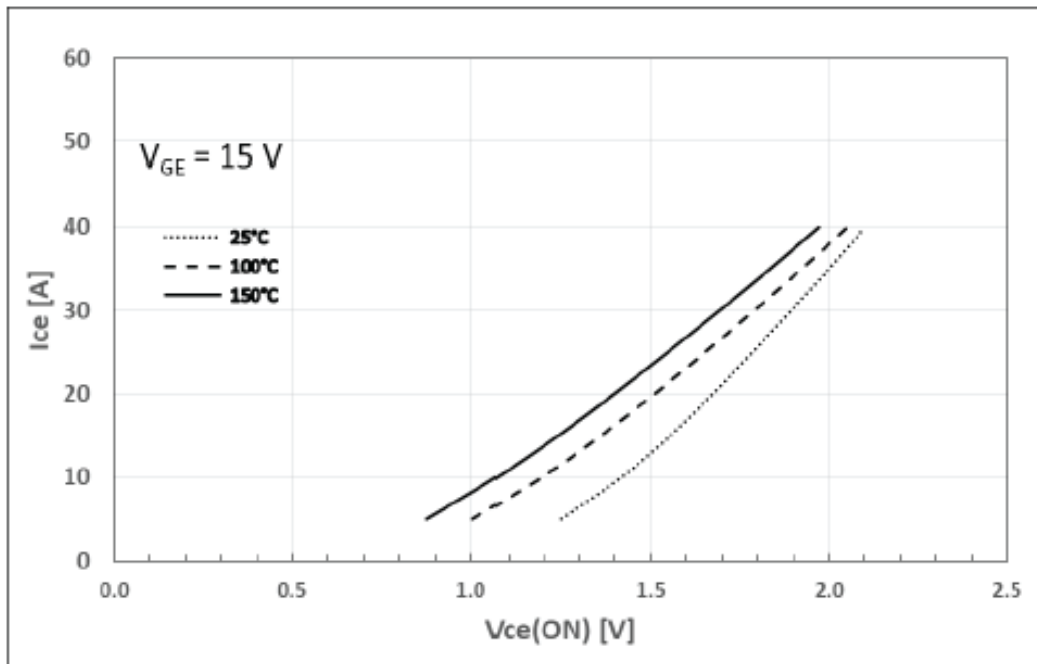


Figure 1: $V_{CE,ON}$ vs. I_c for different temperatures

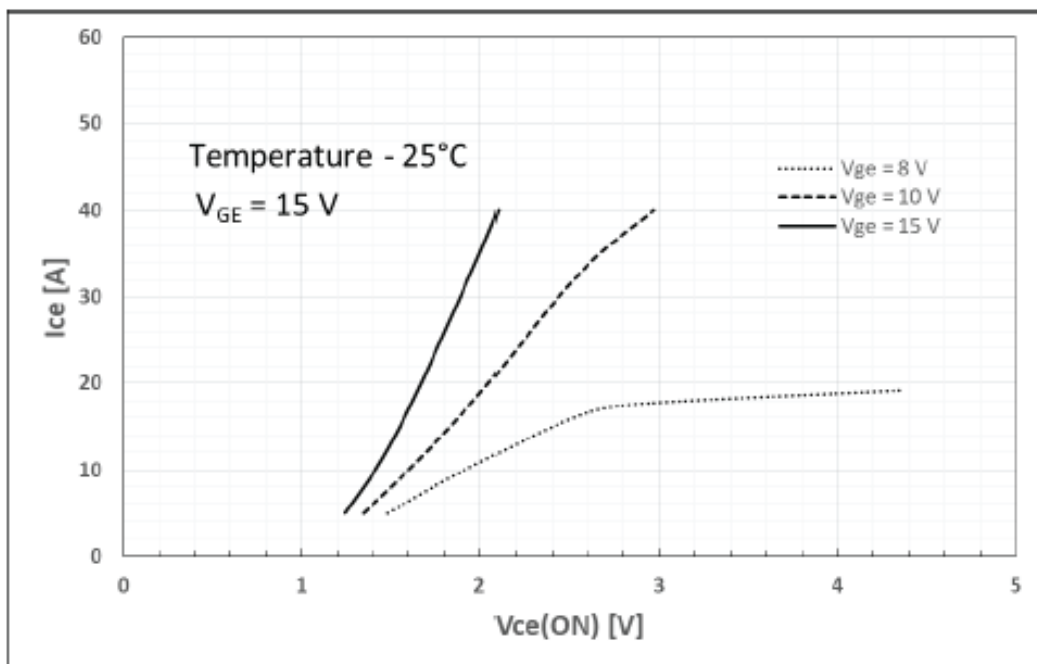


Figure 2: $V_{CE,ON}$ vs. I_c for different V_{GE}

Typical Operating Characteristics

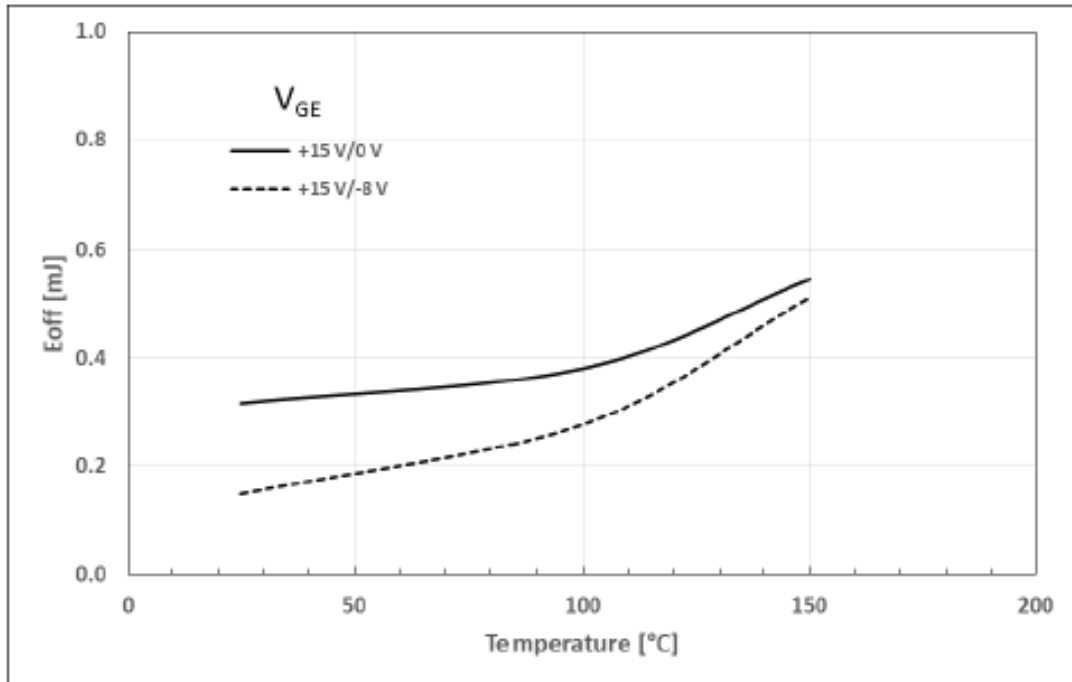


Figure 3: E_{OFF} vs. Temperature ($I_{CE}=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $R_G=6\Omega$)

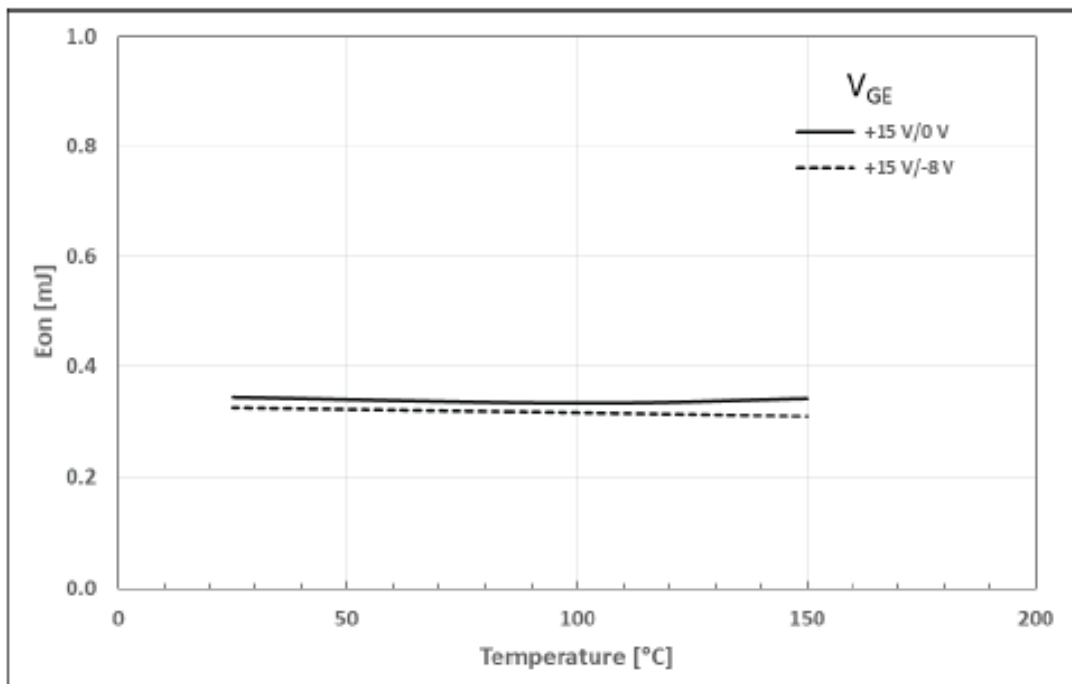


Figure 4: E_{ON} vs. Temperature ($I_{CE}=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $R_G=6\Omega$)

Typical Operating Characteristics

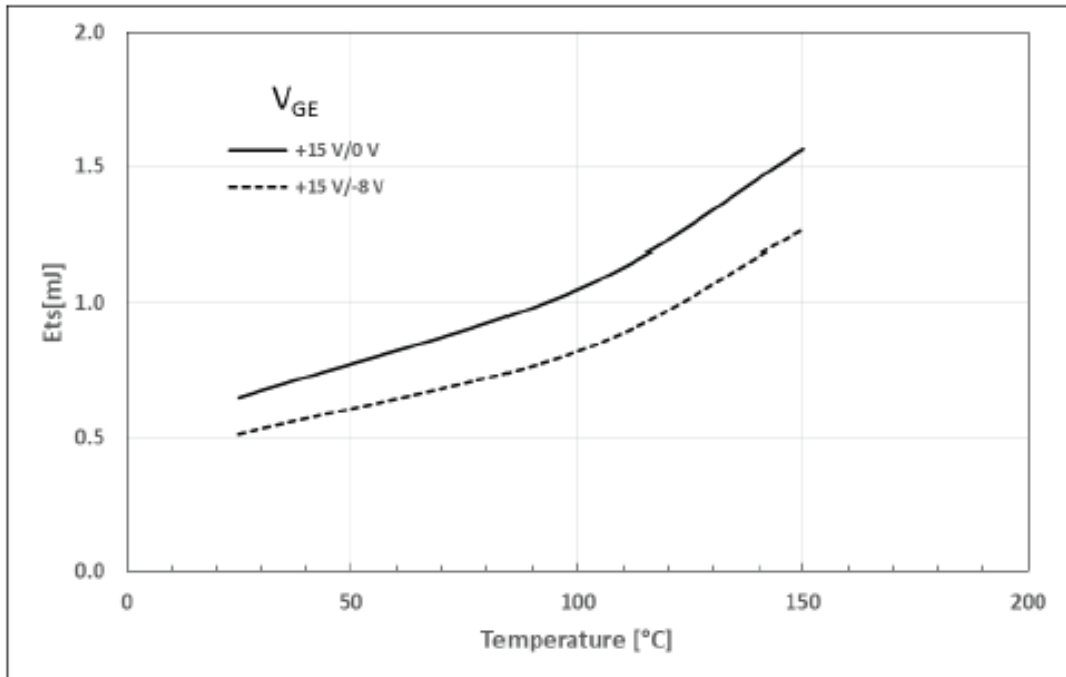


Figure 5: E_{TS} vs. Temperature ($I_{CE}=20A$, $V_{CC}=400V$, $V_{GE}=15V$, $R_G=6\Omega$)

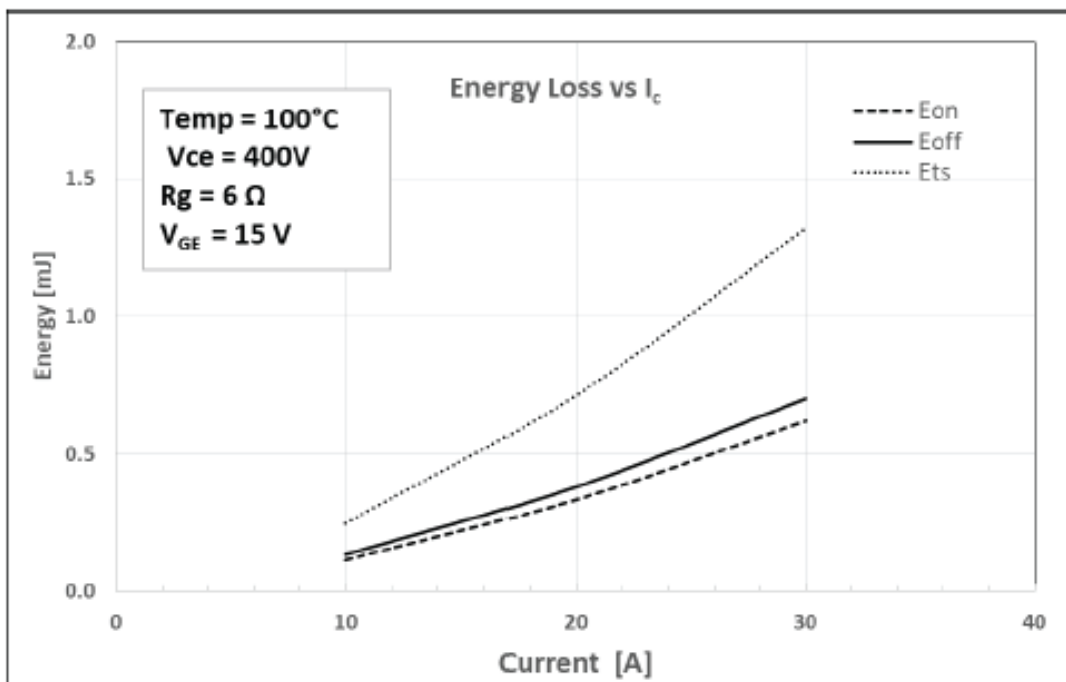


Figure 6: Energy Loss vs. Current

Typical Operating Characteristics

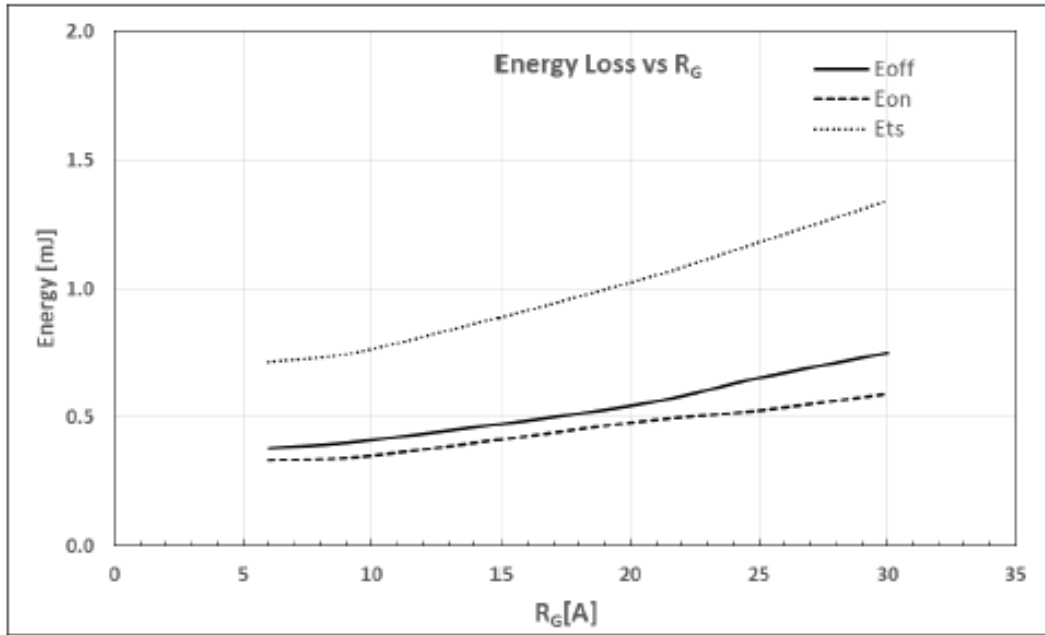


Figure 7: Energy Loss vs R_G

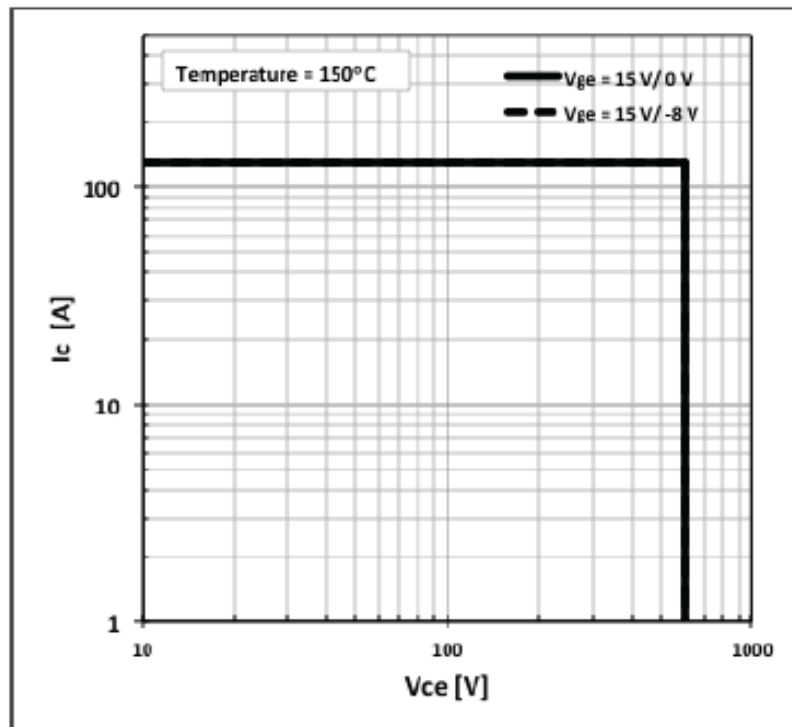


Figure 8: Turn-Off SOA (400V Applied)

Typical Operating Characteristics

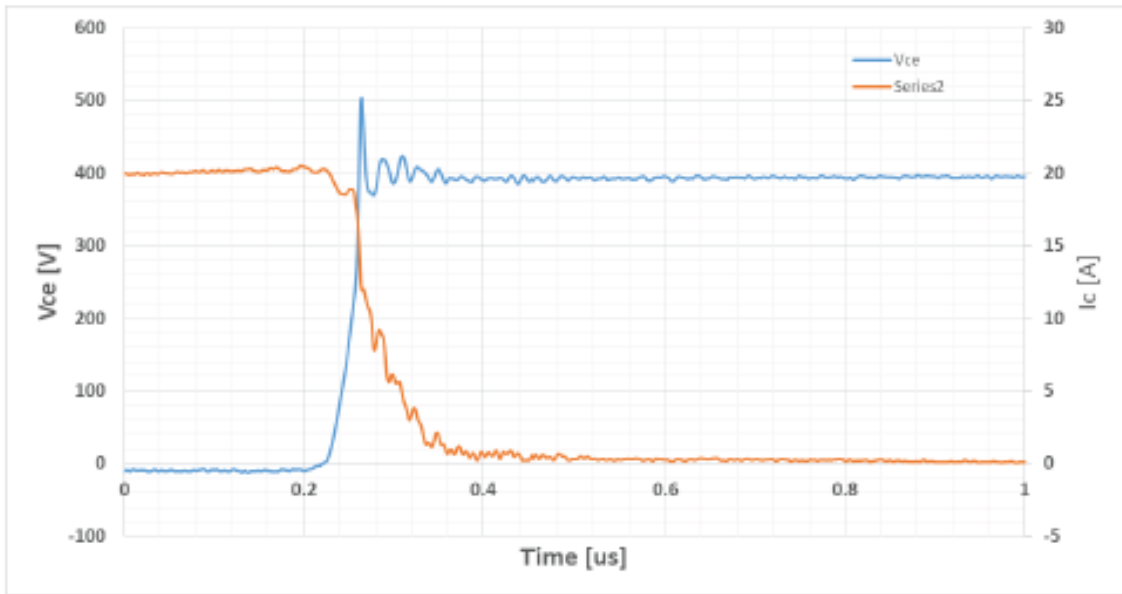


Figure 9: Turn OFF Waveform ($V_{GE} = 15V/0V$, $R_G=6\Omega$, $T=25^\circ C$)

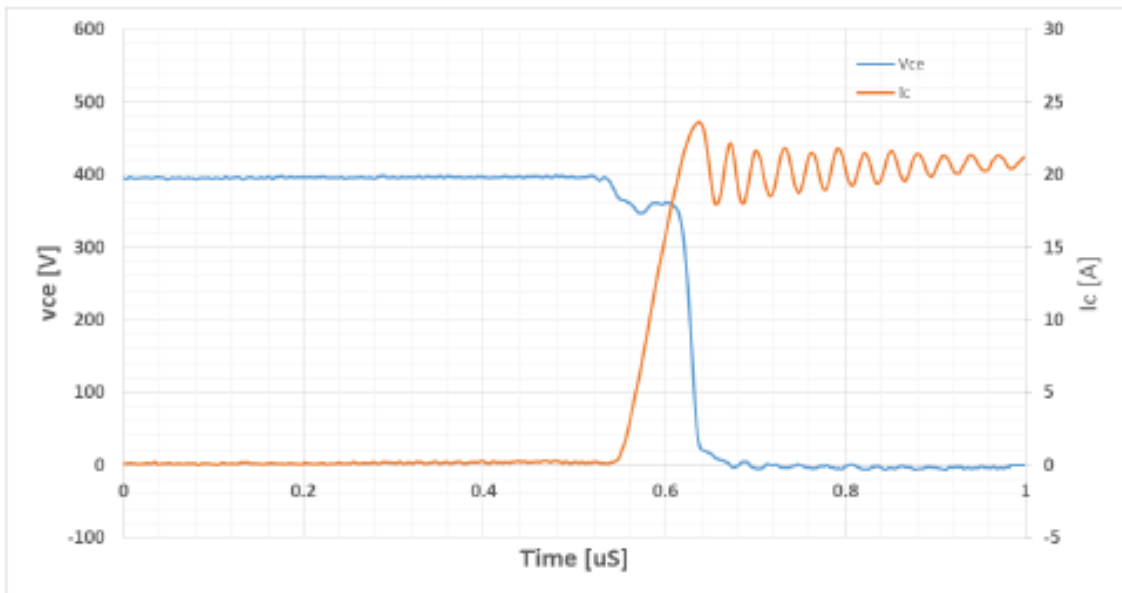


Figure 10: Turn ON Waveform ($V_{GE} = 15V/0V$, $R_G=6\Omega$, $T=25^\circ C$)

Typical Operating Characteristics

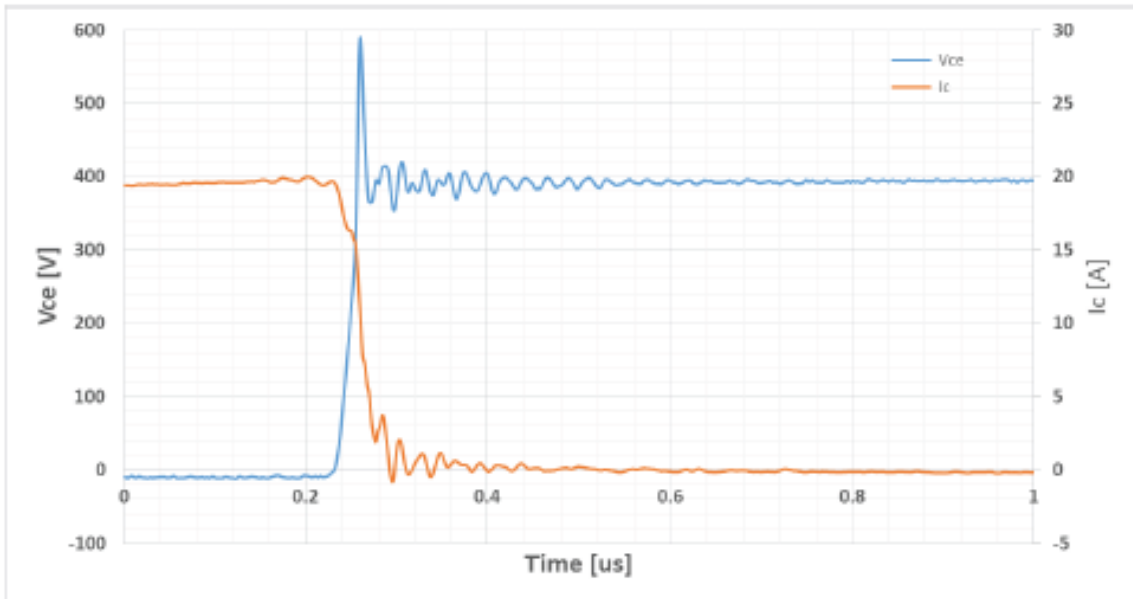


Figure 11: Turn OFF Waveform ($V_{GE} = 15V/-8V$, $R_G=6\Omega$, $T=25^\circ C$)

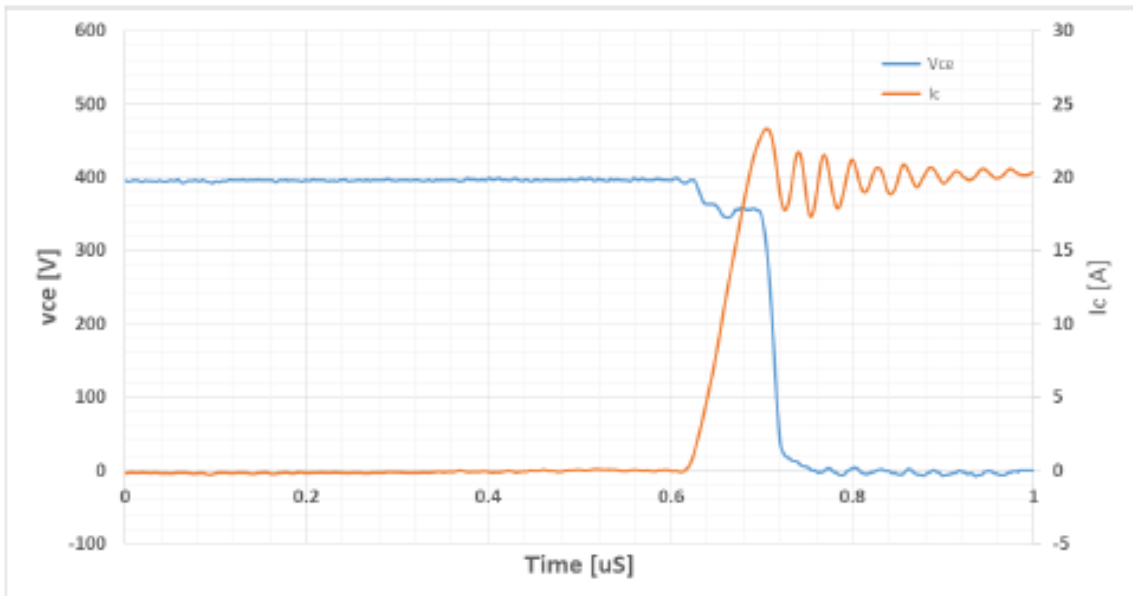


Figure 12: Turn ON Waveform ($V_{GE} = 15V/-8V$, $R_G=6\Omega$, $T=25^\circ C$)

Pin Configuration

Pin Number	Description
1	Gate
2	Collector
3	Emitter

Package Drawing

